2N® StarGate

User Manual

Version 5.4
Firmware 1.16.5

www.2n.cz

The 2N TELEKOMUNIKACE joint-stock company is a Czech manufacturer and supplier of telecommunications equipment.

The product family developed by 2N TELEKOMUNIKACE a.s. includes GSM gateways, private branch exchanges (PBX), and door and lift communicators. 2N TELEKOMUNIKACE a.s. has been ranked among the Czech top companies for years and represented a symbol of stability and prosperity on the telecommunications market for almost two decades. At present, we export our products into over 120 countries worldwide and have exclusive distributors on all continents.

2N® is a registered trademark of 2N TELEKOMUNIKACE a.s.. Any product and/or other names mentioned herein are registered trademarks and/or trademarks or brands protected by law.

2N TELEKOMUNIKACE administers the FAQ database to help you quickly find information and to answer your questions about 2N products and services. On www.faq.2n.cz you can find information regarding products adjustment and instructions for optimum use and procedures „What to do if...".

Declaration of Conformity

2N TELEKOMUNIKACE hereby declares that the 2N® StarGate product complies with all basic requirements and other relevant provisions of the 1999/5/EC directive. For the full wording of the Declaration of Conformity see the CD-ROM enclosed and at www.2n.cz.

The 2N TELEKOMUNIKACE company is the holder of the ISO 9001:2009 certificate. All development, production and distribution processes of the company are managed by this standard and guarantee a high quality, technical level and professional aspect of all our

Content

1. Product Overview 5

1.1 Compatibility 6
1.2 System 8
1.3 Product Description 17
1.4 Innovations 19
1.5 Terms and Symbols Used 20

2. Description and Installation 21

2.1 Plug-In Boards 22
2.2 Antenna and Antenna Splitters 40
2.3 Gateway Rack Configuration 47
2.4 Installation 49

3. Configuration 59

3.1 Important Default Settings 60
3.2 Quick Step-by-Step Manual 63
3.3 Web Configuration Interface 65
3.4 Enhanced CPU Configuration 114
3.5 2N® External Routing Machine 130
3.6 2N® SIM Star System 147

4. List of AT Commands 149

4.1 Basic Commands 150
4.2 Configuration Commands 152

5. Advanced Configuration 161

5.1 List of Status Codes 162
5.2 Trace 169
5.3 Tracing 171
5.4 List of LOG Events 172
5.5 CDR Line Description 174
5.6 SDR Line Description 175
5.7 Statistics 176
5.8 List of SNMP traps 178

6. Technical Parameters 180

6.1 2N® StarGate Technical Parameters 181
6.2 2N® BlueTower Technical Parameters 184

7. Supplementary Information 186

7.1 Troubleshooting 187
7.2 List of Abbreviations 188
7.3 Regulations and Directives 190
7.4 General Instructions and Cautions 191

1. Product Overview

In this section, we introduce the **2N® StarGate / BlueTower** product, outline its application options and highlight the advantages following from its use. This section also includes safety instructions.
Here is what you can find in this section:

- 1.1 Compatibility
- 1.2 System
  - 2N® StarGate
  - 2N® BlueTower
- 1.3 Product Description
- 1.4 Innovations
- 1.5 Terms and Symbols Used

1.1 Compatibility

This section describes compatibility of the earlier HW versions with the new CPU version. Obey the instructions included herein to make your **2N® StarGate / BlueTower** system work correctly.

CPU

	New CPU version	Earlier CPU version
Serial number	M202-xxxxxxxxxx	M112-xxxxxxxxxx
Web interface	YES	NO
SIM Client (SIMStar Server support)	YES	NO
Integrated AUX	YES	NO
SMS sending/receiving account	YES	NO

PRI Board

- Use the PRI1/PRI2 card of version PRI132 and higher with the new CPU.

- Using a PRI card other than that described above may lead to the **2N® StarGate / BlueTower** system malfunction.

VoIP Board

- The VIP172 VoIP card can be used both for the ealier and new CPU versions.

AUX Board

- The AUX card is no more available in the new **2N® StarGate / BlueTower** system as the AUX inteface is integrated in the CPU.

- Do not use the AUX card with your new CPU as the AUX card is not part of the **2N® StarGate / BlueTower** system any more.

GSM/UMTS Board

- The new CPU is compatible with all the GSM/UMTS cards described in the GSM / UMTS Board subsection.

- The following cards only support the **2N® SIM Star** service with the new CPU version.
  - UMTS board with 2 Telit UC864–G engines, 4SIM/channel, **2N® SIM Star** support. Part No. 5070553E.
  - GSM board with 2 Wavecom Q55 (WMP100) engines, 4SIM/channel, **2N® SIM Star** support. Part No. 5070550E.
- The **2N® SIM Star** service is not available with the old CPU versions for the above mentioned cards.

1.2 System

This user manual is designed for two types of gateways. Both the gateways have the same features and differ in the maximum capacity of the GSM / UMTS channels used.

- 2N® StarGate
- 2N® BlueTower

2N® StarGate

Basic Dimensions

2N® StarGate is the biggest GSM gateway in the **2N® PRI** gateway family. The system is integrated in a 19" subrack of the height of 3U and depth of 360mm. The front side is open, equipped with slots for plug–in boards with front panels. The panel includes the main switch. In case not all GSM / UMTS cards are plugged in, the vacant front section must be covered with a fixed panel(s).

The whole backside is covered with a panel with a built–in active fan, which is automatically switched on whenever the power supply temperature exceeds 70°C. The main power supply unit is located in front of the fan. The bottom and upper sides are covered by perforated sheet and the assembly flanges are provided with handrails.

The system bus is designed as a printed circuit board (PCB) with DIN connectors and fitted to the inner subrack carrier profiles.

Front Side Division

The subrack width is divided into an 8HP–wide mains panel and 19x4HP–wide modules in the following sequence (from right to left):

VoIP version	
Fixed panel with a main switch (AC type) or power connectors (DC type)	8HP
VoIP card	4HP
Basic or enhanced CPU card	4HP
Empty position	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

ISDN version	
Fixed panel with a main switch (AC type) or power connectors (DC type)	8HP
Empty position	4HP
Basic or enhanced CPU card	4HP
1ISDN PRI or 2ISDN PRI card	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

ISDN + VoIP version	
Fixed panel with a main switch (AC type) or power connectors (DC type)	8HP
VoIP card	4HP
Basic or enhanced CPU card	4HP
1ISDN PRI or 2ISDN PRI card	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

Examples of Used Types

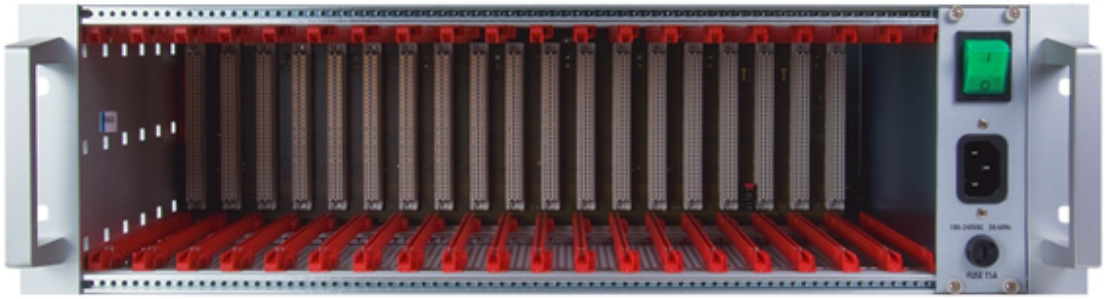


Figure: Empty **2N® StarGate** Rack

Warning

- Make sure that the backside jumpers have been connected properly in the rack to make your system work correctly. Refer to Gateway Rack Configuration for more details.

Figure: 2N® StarGate with 16 GSM Boards, Enhanced Basic CPU, VoIP Interface and AC Power Supply

Figure: 2N® StarGate with 16 UMTS Boards, Enhanced CPU, 2 ISDN PRI Interfaces and AC Power Supply

Figure: 2N® StarGate with 16 UMTS Boards, Enhanced CPU, 2 ISDN PRI, VoIP Interfaces and AC Power Supply

- The PRI/CPU/VoIP card positions are fixed and may not be interchanged in the rack.

Note

- Please keep all cards in the right positions. Wrong positions will cause malfunction of the whole system!
- In the case of VoIP card replacement by ISDN PRI (and vice versa) please read the instructions in Section 2.4 Installation.

Power Supply

The system uses an industrial power supply unit with natural cooling and an auxiliary external fan, which is switched on automatically whenever the power supply temperature exceeds 70°C. The power supply unit is designed with a 30% reserve even under the maximum load.

Power supply types

- Internal 90 – 260V / 50 – 60 Hz (output 5V / 30A).
- 2x Internal 90 – 260V / 50 – 60 Hz (output 5V / 30A) (redundant).
- Internal 48 DC (output 5V / 30A).

The type of the power supply unit to be used depends on the part number.

Caution

- Make sure that the incoming supply is matching the requested values!
- High voltage may cause a serious injury or death!

Tip

- You are recommended to connect the gateway to the UPS system.

2N® BlueTower

Basic Dimensions

2N® BlueTower is the smallest of the **2N® PRI** gateway family, featuring the capacity up to 8 GSM / UMTS channels. The system is integrated in a small 19" subrack of the height of 3U, width of 29HP and depth of 320mm. The front side is open, equipped with slots for plug–in boards with front panels. The panel includes the main switch. In case not all GSM / UMTS cards are plugged in, the vacant section of the front side must be covered with a fixed panel(s). An optional antenna splitter can be installed.

The whole backside is covered with a panel with a built–in safety–fuse box and power socket. The main power supply unit is inside the system and is fully designed for passive cooling. The bottom and upper sides are covered with EMC sheet.

The system bus is designed as a printed circuit board (PCB) with DIN connectors and fitted to the inner subrack carrier profiles.

Front Side Division

The subrack width is divided into 7x4HP–wide modules in the following sequence (from right to left):

VoIP version	
VoIP card	4HP
Basic or enhanced CPU card	4HP
Empty position	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

ISDN version	
Empty position	4HP
Basic or enhanced CPU card	4HP
1ISDN PRI or 2ISDN PRI card	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

ISDN + VoIP version	
VoIP card	4HP
Basic or enhanced CPU card	4HP
1ISDN PRI or 2ISDN PRI card	4HP
GSM or UMTS cards (one for two GSM / UMTS channels)	Remaining space (each 4HP)

- Please keep the GSM/PRI/CPU/VoIP card positions. The positions are fixed and may not be interchanged.
- 4 positions are only designed for the GSM/UMTS cards (from left to right).

Examples of Used Types

Figure: 2N® BlueTower with 2 UMTS Boards, Enhanced CPU, VoIP Interfaces and Integrated Antenna Splitter

Figure: 2N® BlueTower with 2 UMTS Boards, Basic CPU, 2 ISDN PRI Interfaces and Integrated Antenna Splitter

Figure: 2N® BlueTower with 2 UMTS Boards, Basic CPU, 2 ISDN PRI, VoIP Interfaces and Integrated Antenna Splitter

Figure: 2N® BlueTower with 4 UMTS Boards, Basic CPU, 2 ISDN PRI, VoIP Interfaces

Note

- Please keep all cards in the right positions. Wrong positions will cause malfunction of whole system!
- In the case of VoIP card replacement by ISDN PRI (and vice versa) please read the instructions in Section 2.4 Installation.

Power Supply

The system uses an industrial power supply unit with natural cooling and an auxiliary external fan, which is switched on automatically whenever the power supply temperature exceeds 70°C. The power supply unit is designed with a 30% reserve even under the maximum load.

Power supply types

- Internal 90–260V / 50 – 60 Hz (output 5V / 30A).

Caution

- Make sure that the incoming supply is matching the requested values!
- High voltage may cause a serious injury or death!

Tip

- You are recommended to connect the gateway to the UPS system.

1.3 Product Description

Basic Features

2N® StarGate / **BlueTower** is a compact yet highly sophisticated system. It supports full remote supervision and configuration via web interface or using an external modem over a BRI–ISDN and analogue line, or over a B channel in a PRI–ISDN trunk. The system has been designed and works with a lot of highly sophisticated functions, which make it fully client–oriented and highly reliable in cooperation with both GSM networks and ISDN. In addition, it provides full monitoring and comfortable (web interface) configuration without functional limitations. Configuration alterations can be made without resetting, i.e. under full operation. Hot–swappable plug–in GSM / UMTS boards, which can be swapped under full operation including SIM cards, are a matter of course. The use of up to eight SIM cards per GSM / UMTS module in combination with an intelligent SIM card switching tool and detailed statistics upgrade this system into a powerful LCR tool. There is also support of remote SIM cards (**2N® SIM Star**) and an external LCR machine (**2N® External Routing Machine**). High product stability is achieved by the fact that the gateway is programmed in the ASM, i.e. an OS–FREE system. The system also features easy installation, simple operation and easy replacement of defective parts as it is composed of plug–in boards that communicate independently along system buses. As already mentioned, the system allows for an easy detection of defective parts, automatic locking against use and easy replacement (hot–swap). Thanks to the above–mentioned properties, the system can be installed and configured successfully within one hour!

Advantages of 2N® StarGate/BlueTower

- Compact size, modularity and hot–swappable solution.
- Up to 32 GSM / UMTS modules (8 in BlueTower).
- Up to 256 SIM cards in a system (StarGate).
- Worldwide use – GSM / UMTS boards support all standard GSM (850/900/1800/1900MHz) and UMTS (850/1900/2100MHz) bandwidths.
- Antenna splitters and a high–gain antenna.
- Support of up to two ISDN PRI (DSS1) or one VoIP (SIP) connections.
- Sending / receiving SMS.
- A large memory for detailed Call Data Records (CDR).
- Detailed call statistics generating.
- Quick start – being free of an operating system (programmed in the processor code), the system is completely ready within 30 seconds after power on/restart. Of course, the full function time of all GSM modules depends on the current load and capacity of the GSM networks to which the gateway is connected.
- Intelligent call processing – Least Cost Routing (LCR), SMS and Voice CallBack, Auto CLIP routing, DISA dial–in.
- Intelligent selection of GSM / UMTS module to be used.
- Support of remote SIM card function (**2N® SIM Star**).
- Possibility to replace internal LCR with an external solution (**2N® ERM**).
- Remote control, configuration and firmware upgrade.
- High connection rate and ASR, low PDD.
- AoC support.
- Direct connection to GSM modules via Telnet protocol.
- SNMP error traps (eCPU).
- FTP access to download CDR, SDR (eCPU).
- Support of lock with defined BTS.

1.4 Innovations

- If you program your **2N®StarGate** / **BlueTower** parameters by means of a computer, you need a web browser (when using the CPU web interface).
- For the most recent firmware version refer to **www.2n.cz** and for necessary instructions see the Others - Update subsection hereof.
- At **www.2n.cz** you will also find the most recent version of this manual in the popular PDF format. We recommend you to use it especially in connection with the firmware upgrade as it introduces new useful functions.
- Preliminary information on functions that are not yet available is typed on a light grey background or is printed in grey letters instead of black ones.

1.5 Terms and Symbols Used

Manual Symbols

The following symbols and pictograms are used in the manual:

Safety
- **Always** abide by this information to prevent persons from injury.

Warning
- **Always** abide by this information to prevent damage to the device.

Caution
- **Important information** for system functionality.

Tip
- **Useful information** for quick and efficient functionality.

Note
- Routines or advice for efficient use of the device.

Future Functions

A grey-marked text in this document specifies the **2N® StarGate/BlueTower** functions that will be supported in the future.

2. Description and Installation

This section describes the **2N® StarGate/BlueTower** product and its installation.

Here is what you can find in this section:

- 2.1 Plug-In Boards
  - Basic CPU Board
  - Enhanced CPU Board
  - GSM / UMTS Board
  - PRI Board
  - VoIP Board
- 2.2 Antenna and Antenna Splitters
- 2.3 Gateway Rack Configuration
- 2.4 Installation

2.1 Plug-In Boards

All the plug-in cards have defined positions in the system rack. Please keep all cards in their respective positions. Wrong positions may cause malfunction of the whole system. The type and quantity of the cards used in your **2N® StarGate** / **BlueTower** gateway depend on the part number of the gateway and other components.

> **Note**
> - All the status LEDs (as described below) provide basic status information only. For detailed information use the terminal or web interface.

Here is what you can find in this section:

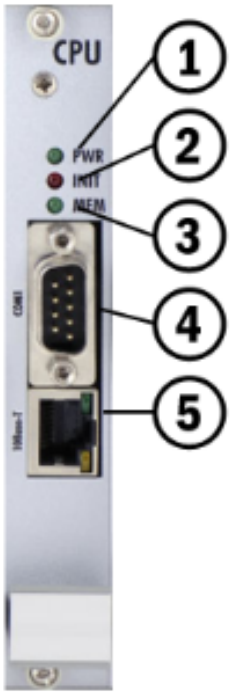
- Basic CPU Board
- Enhanced CPU Board
- GSM / UMTS Board
- PRI Board
- VoIP Board

Basic CPU Board

The basic CPU board carries only the main CPU, which supports all basic features of the gateway (web interface, **2N® SIM Star** support, SMS) . The advanced features of the enhanced version (SMS2Outlook, SNMP, SMS/Call simulator) are not available.

Board Description

The CPU board contains a processor system controlling the whole system. The board is designed on a 4–layer PCB of the size of 160x100mm. A simple COM1 serial interface, an Ethernet connector (100Base–T) and 5 board status LED indicators are located on the front panel.



1. Indicates board supply; the LED is green if the gateway is powered on and shows no malfunction.
2. Indicates board initialisation or malfunction.
3. Indicates CDR memory (not shining = empty; flashing 1:1 = 50% full memory; shining = 100% full memory.
4. 1st serial interface of the basic CPU.
5. 10BaseT Ethernet connection of the basic CPU.

COM1 Serial Interface Parameters

The COM1 interface is used as a local port for temporary connection of a PC (terminal) for installation and servicing purposes and permanent connection of the SMS server (supervision PC). It provides local monitoring, configuration, tracing and firmware upgrade.

- Transmission rate: 57.6 kbps
- Bit format: start, 8bit, stop (no parity)
- Signals: RXD, TXD, RTS, CTS, GND

Configuration Jumpers

The figure below shows the CPU configuration jumper. The JP1 jumper can be connected in one of the following three positions.

- CPU – COM1 communication port is active for communication with the CPU.
- eCPU – COM1 communication port is active for communication with the eCPU.
- DEF – used for CPU default reset.

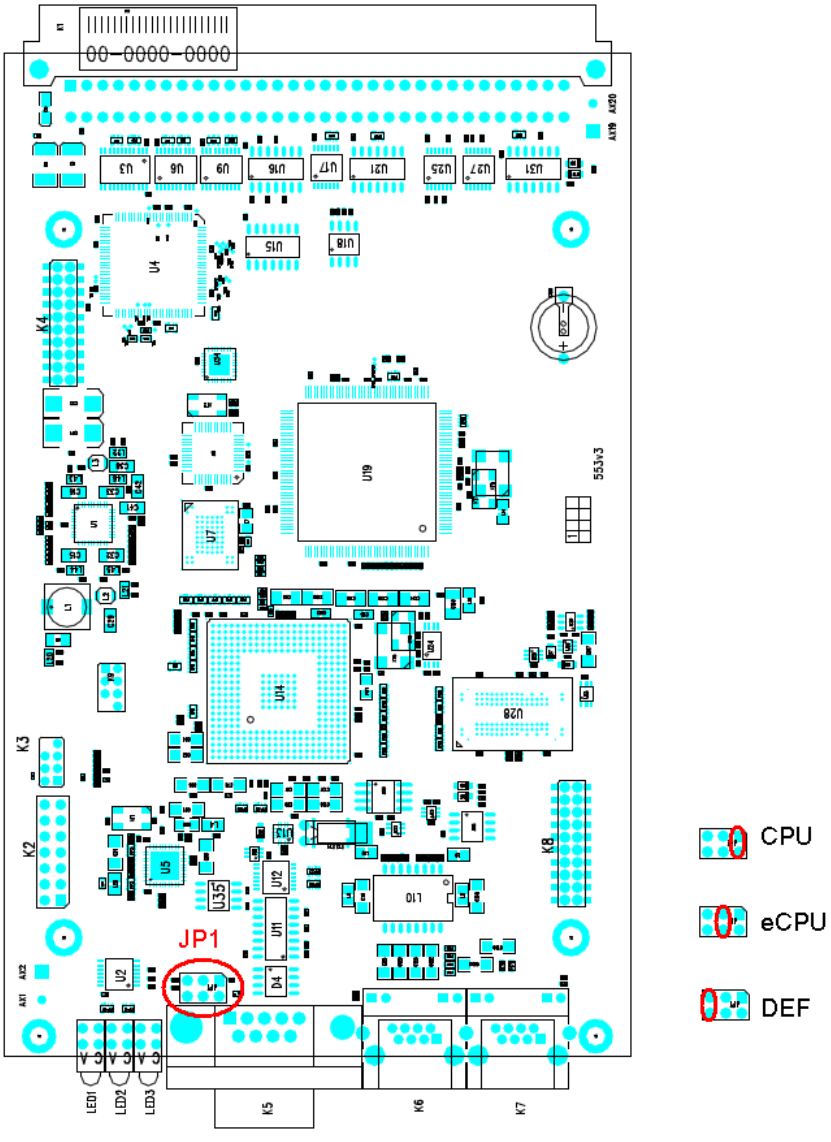


Figure: Configuration Jumpers

Enhanced CPU Board

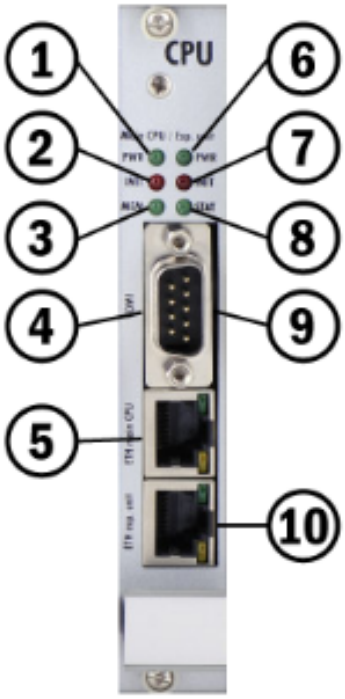
The enhanced version of the CPU board carries two boards with a main CPU and an extension unit. The main CPU and extension unit have a dedicated Ethernet connector and share a serial interface (switchable by the jumper located on the main CPU board). The enhanced CPU board supports all the basic CPU features and some additional features:

- Graphic web interface.
- Support of the SMTP and POP3 protocols for sending / receiving SMS.
- CDR downloader (an SD card is required).
- SMS and Call simulator.
- SNMP remote control.
- FTP access for CDR and SRD.

Some features can be limited by the licence file. For detailed information please read the Gateway Control subsection.

Board Description

The board is designed on a 4–layer PCB of the size of 160x100mm. There is also an extension card located on the main PCB. The board has one simple COM1 serial interface shared by both the CPUs, two Ethernet connectors (CPU=100Base–T and Ext. unit=100Base–T), and 10 board status LED indicators on the front panel.



1. Indicates board supply. The LED is green in case the gateway is powered on and shows no malfunction.
2. Indicates board initialisation or malfunction.

3. Indicates CDR memory (not shining = empty; flashing 1:1 = 50% full memory; shining = 100% full memory).
4. Shared serial interface. To switch to the basic CPU connect JP1 on the main CPU card.
5. 100Base–T Ethernet interface of the basic or enhanced CPU board.
6. Indicates (shining) that the extension unit is powered on.
7. Indicates (shining) that the extension unit's CPU is IDLE.
8. Indicates (flashing 1:1) that the CPU is not stopped.
9. Shared serial interface. To switch to the basic CPU connect JP1 on the main CPU card.
10. 100BaseT Ethernet interface of the extension unit of the enhanced CPU board.

COM1 Serial Interface Parameters

The COM1 interface is used as a local port for temporary connection of a PC (terminal) for installation and servicing purposes and permanent connection of the SMS server (supervision PC). It provides local monitoring, configuration, tracing and firmware upgrade.

In the case of switch JP1, switch the COM1 interface to Ext. unit where you find the console menu for basic Ext. unit IP settings. To locate JP1 please check the figure in the Configuration Jumpers subsection below.

Basic CPU Connection

Transmission rate: 57.6 kbps
Bit format: start, 8bit, stop (no parity)

Signals: RXD,TXD,GND

Ext. Unit Connection

Transmission rate: 115.2 kbps
Bit format: start, 8bit, stop (no parity)
Signals: RXD,TXD,GND

Configuration Jumpers

There are two configuration jumpers on the enhanced CPU board. JP1 is intended for switching the serial port between the CPU board and an optional extension board. JP2 is designed for restoring default settings of the enhanced CPU. JP2 is located on the upper PCB. To restore the default values follow the steps below:

- Switch off the GSM gateway.
- Remove the CPU card and connect JP2.
- Insert the CPU card and switch on the GSM gateway.
- Wait for one minute and switch off the GSM gateway again.
- Remove the CPU card and release JP2.
- Insert the CPU card and switch on the GSM gateway.

Now the factory settings are restored on the enhanced CPU.

Tip

- To restore the factory settings you can also get connected to the serial console and select the Factory reset option.

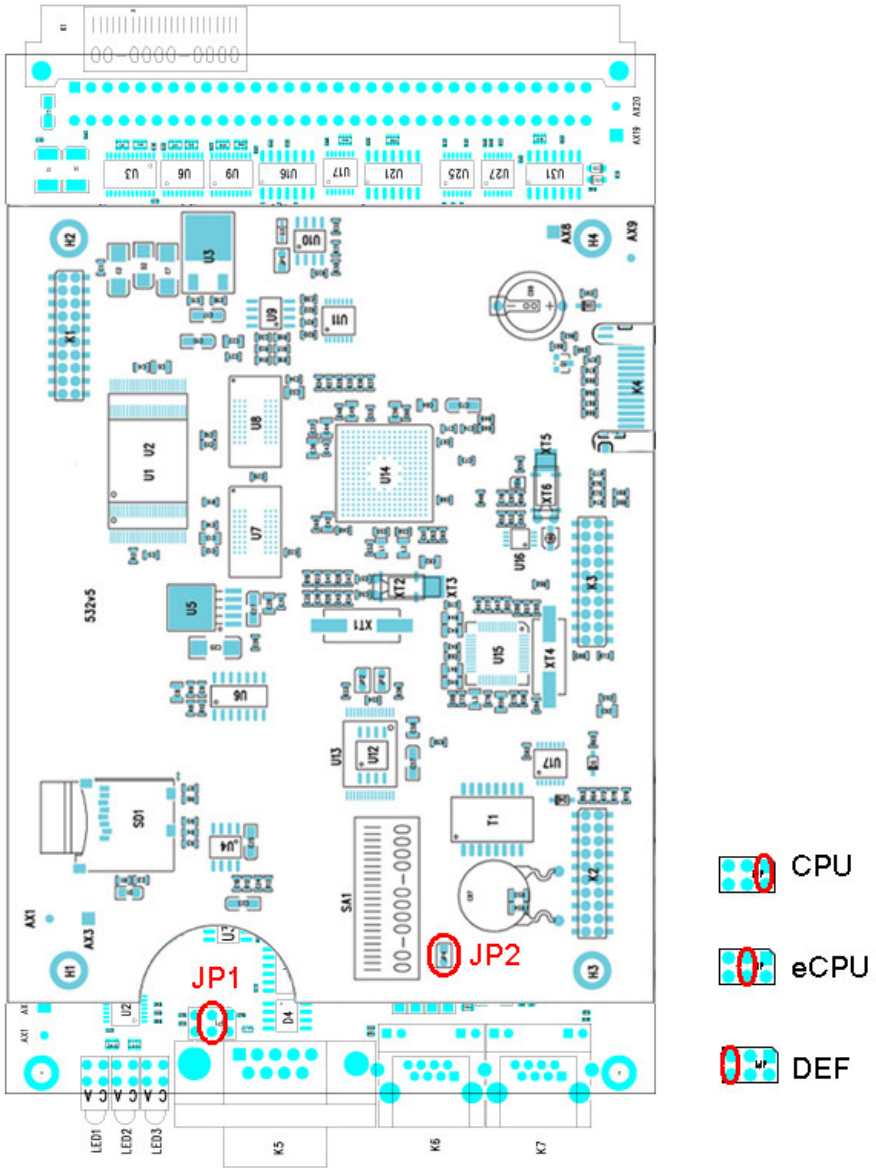


Figure: Configuration Jumpers

GSM / UMTS Board

eBoard Description

The GSM / UMTS board contains two GSM or UMTS wireless modules, circuits for their connection to the PCM bus, and DTMF receivers (+CPU in the case of board with the **2N® SIM Star** support). The board is designed on a 4–layer PCB of the size of 160x100mm. Pins 1 and 32 are approximately 1 mm longer in the GSM board system connector and are used for 'hot swap' power feeding, allowing to push the board in and out even during operation. This feature is especially handy while installing or replacing SIM cards. Two SMA antenna connectors and 5 board status indicators are located on the front panel.

1. PWR – Board supply indication
   - Shining: Switched on.
   - Flashing: Board in the sleep mode.
2. INIT – Board initialisation indication
   - Shining: Board faulty or not yet initialised.
   - Flashing: Board initialisation failure or system incompatibility.
3. SLP – Board sleep state indication
   - Shining: Both wireless channels manually blocked.
4. CH1/CH2 – Wireless engine state indication
   - Shining RED: Wireless engine blocked or switched off.
   - Flashing RED: Wireless engine restart in progress.
   - Shining GREEN: Proceeding call.
   - Flashing slowly GREEN: Call terminating or voice settings in progress.

- Flashing quickly GREEN: Wireless engine trying to log in.
- Light off: Wireless engine ready for calling.

5. SMA female antenna connector of wireless engines

Tip

- For an easy SIM card replacement, all GSM / UMTS boards are designed as hot–swappable units.

Board Types

The **2N® StarGate / BlueTower** gateway can use several types of GSM or UMTS boards. The board specification includes the type of wireless device(s), count of SIM cards channel and **2N® SIM Star** support data.

Table of available GSM / UMTS cards (2013):

Order No.	GSM / UMTS card
5070554E	GSM board with 2xTelit GE910 engines, 4SIM/channel, **2N® SIM Star** support
5070078E	GSM board with 2xTelit GE910 engines, 1SIM/channel, **2N® SIM Star** support
5070551E	GSM board with 2 Cinterion MC55i engines, 4SIM/channel, no **2N® SIM Star** support
5070082E	GSM board with 2 Cinterion MC55i engines, 8SIM/channel, no **2N® SIM Star** support
5070077E	GSM board with 2 Cinterion MC55i engines, 1SIM/channel, **2N® SIM Star** support
N/A	GSM board with 2 Wavecom Q55 (WMP100) engines, 4SIM/channel, no **2N® SIM Star** support
N/A	GSM board with 2 Wavecom Q55 (WMP100) engines, 8SIM/channel, no **2N® SIM Star** support
N/A	GSM board with 2 Wavecom Q55 (WPM100) engines, 1SIM/channel, **2N® SIM Star** support
N/A	GSM board with 2 Wavecom Q55 (WMP100) engines, 4SIM/channel, **2N® SIM Star** support, N/A.
N/A	UMTS board with 2 SierraWireless MC8790V engines, 4SIM/channel, no **2N® SIM Star** support
N/A	UMTS board with 2 SierraWireless MC8790V engines, 1SIM/channel, **2N® SIM Star** support
5070553E	UMTS board with 2 Telit UC864–G engines, 4SIM/channel, **2N® SIM Star** support
5070555E	UMTS board with 2xTelit HE910 engines, 4SIM/channel, **2N® SIM Star** support

Note

- The GSM / UMTS boards can be locked for use in defined GSM / UMTS networks only. For additional information please ask your system supplier.

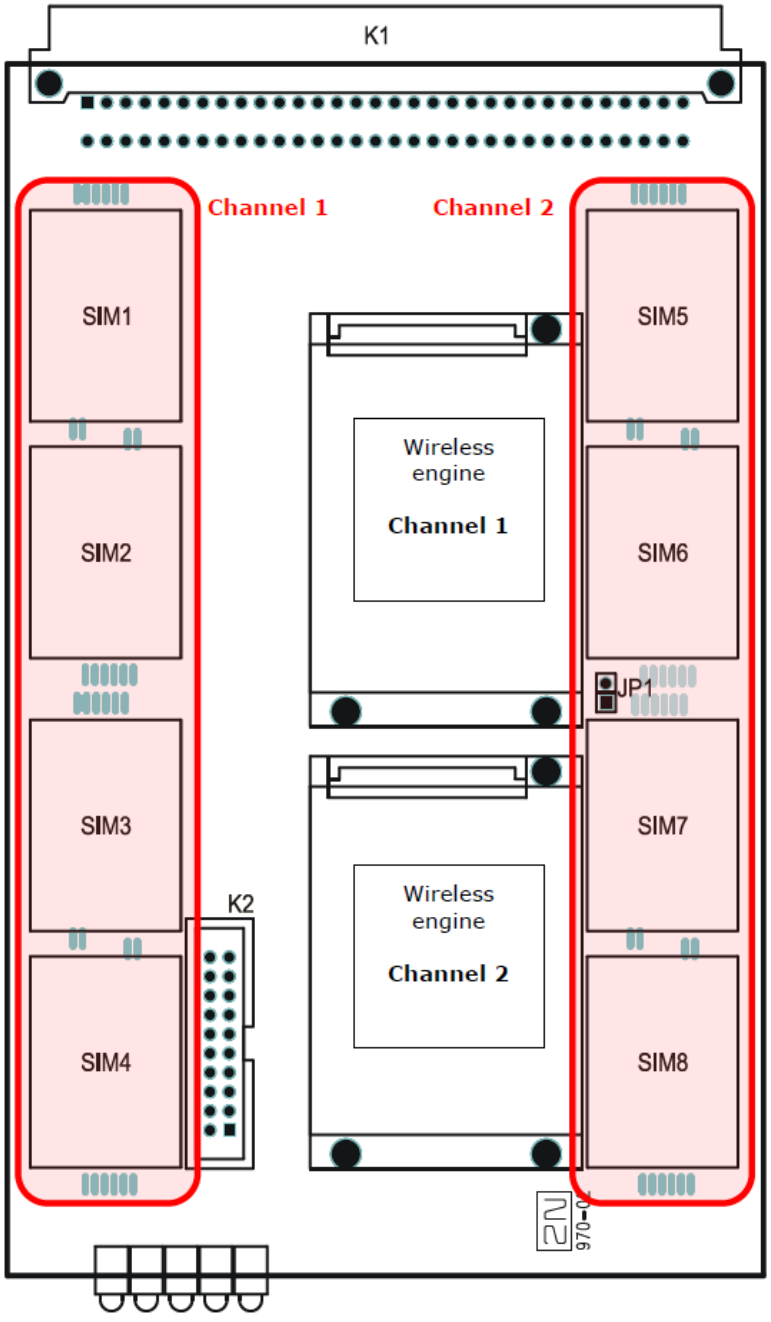


Figure: SIM Card Positions on 4SIM/Channel Boards

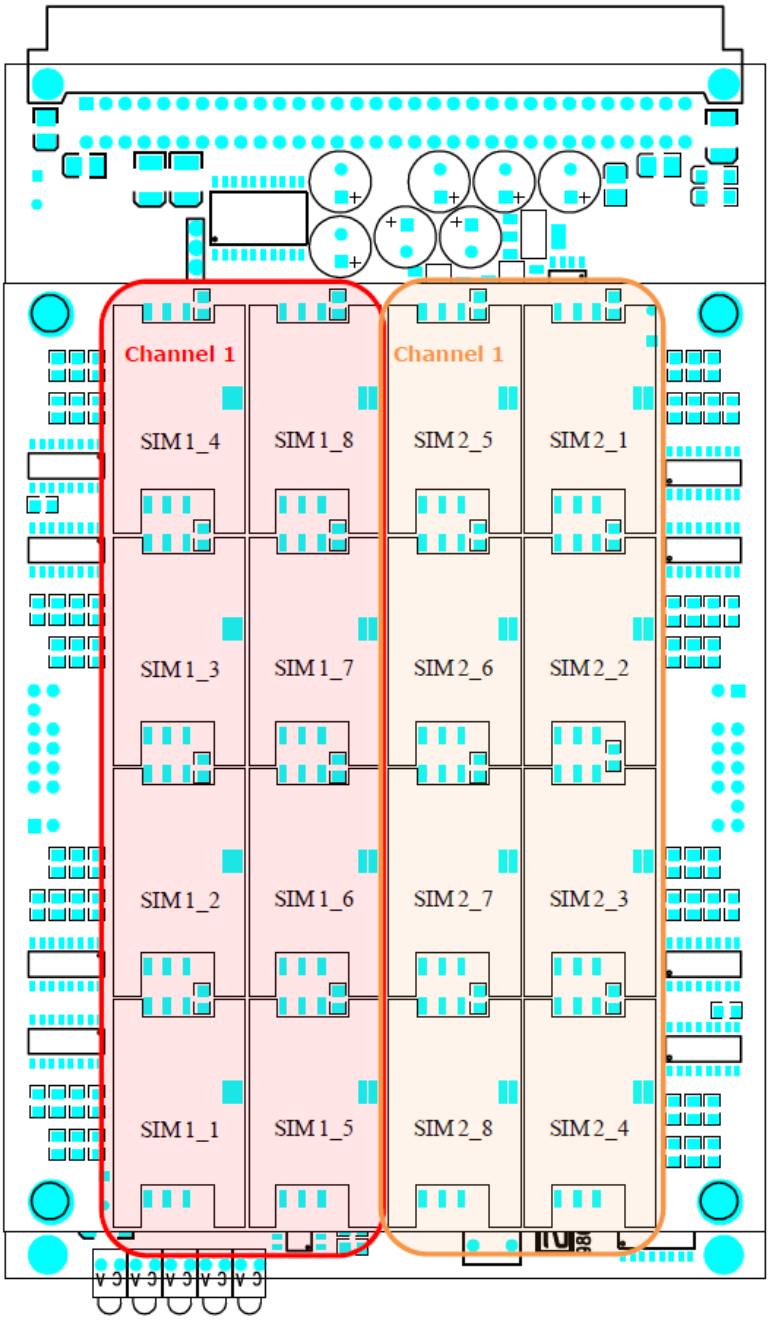


Figure: SIM Card Positions on 8SIM/Channel Boards

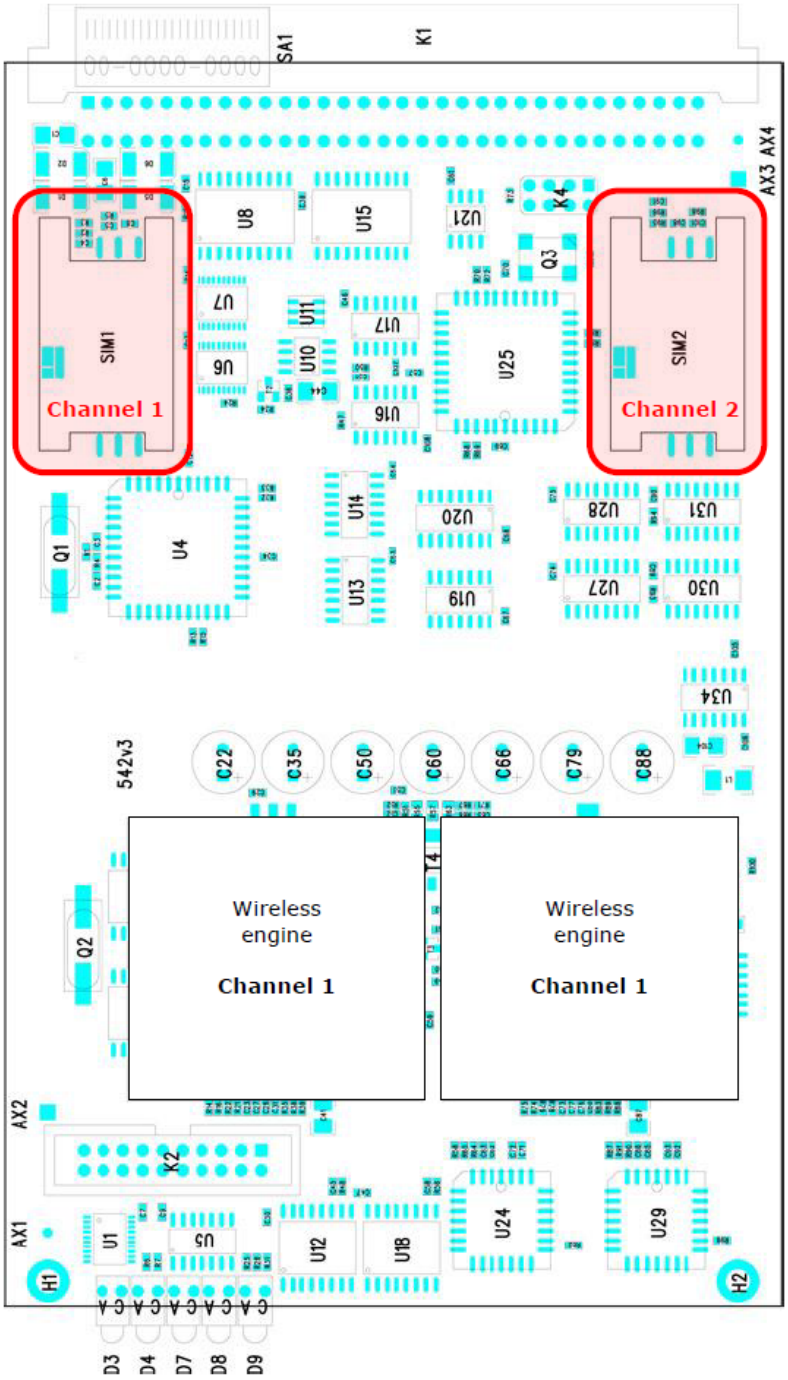


Figure: SIM Card Positions on 1SIM/Channel Boards

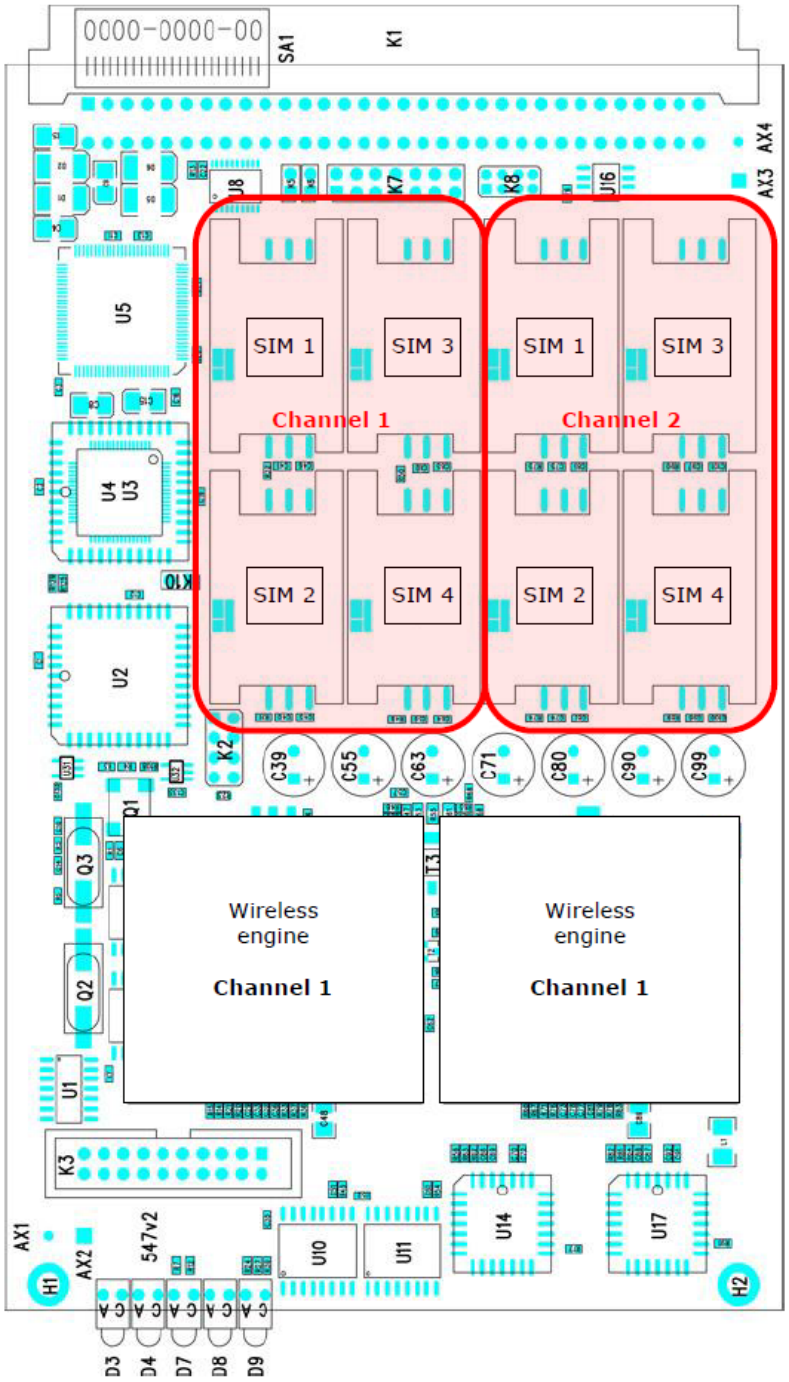


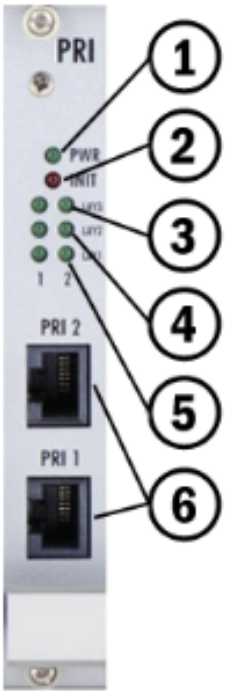
Figure: SIM Card Positions on 4SIM/Channel Boards

PRI Board

Board Description

The PRI board contains one or two (depends on the part number) ISDN interfaces and PCM bus timing circuits. PRI 1 is designed as an internal interface (with an activated LCR function) and PRI 2 as an external interface (all calls from the port are always routed to PRI 1). The interface can work in the MASTER or SLAVE mode (set the PRI 1 mode using the web interface and PRI 2 has always the opposite mode). The output can be configured as TERMINAL (TE) or NETWORK (NT) by jumpers (switching of wires – for software switch you have to use the web interface!). The settings of these jumpers HAVE TO match the PRI configuration – two NT and TE modes will cause malfunction of the PRI board or back–up connection* ! The board is designed on a 4–layer PCB of the size of 160x100mm. There are also 5 (or 8 in 2ISDN PRI) board status indicators, which are located on the front panel.

- The PRI board contains four switches (can be deactivated by jumpers), which provide hardware connection between PRI 1 and PRI 2 in case the system is switched off or inoperative.



1. Board supply indication
   - Shining: Switched on
   - Flashing: Board in the sleep mode
2. Board supply indication
   - Shining: Switched on
   - Flashing: Board in the sleep mode
3. Status of ISDN layer 3 on PRI 1/2 interfaces
   - Shining: One or more calls are connected over selected interface

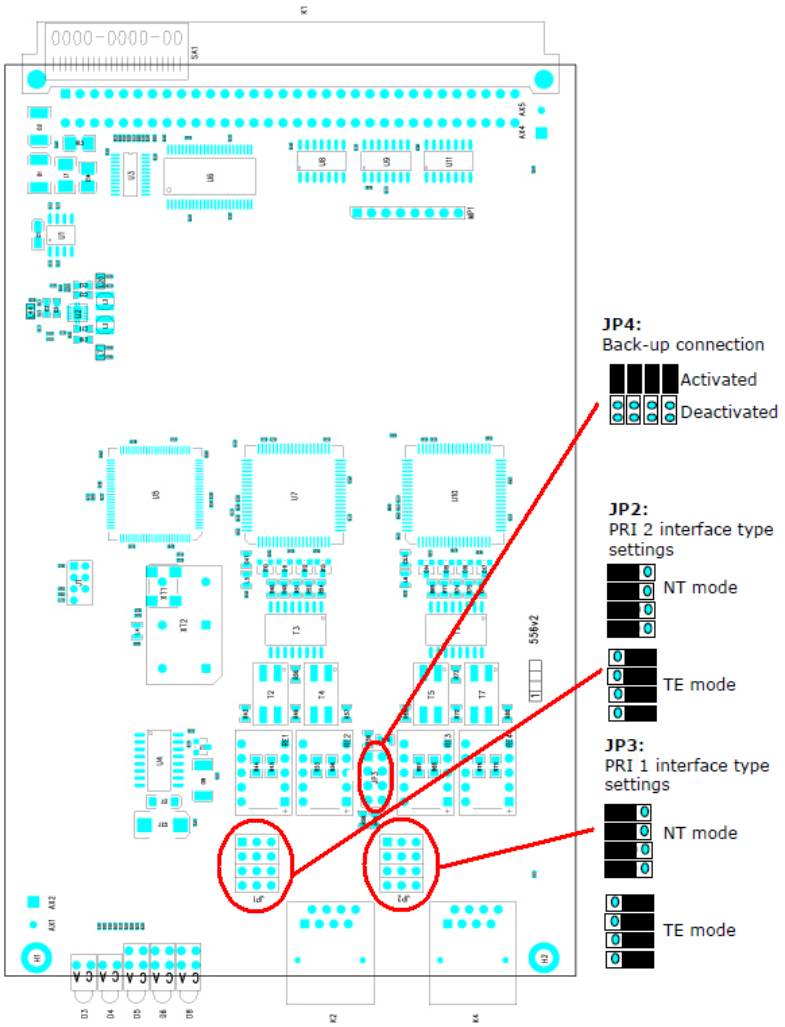
- Flashing: B–channel in restartLight off: No active call

4. Status of ISDN layer 2 on PRI 1 (2) interfaces:
   - Shining: Layer 2 successfully established
   - Flashing: Layer 2 in the establishing process
   - Light off: Layer 2 disconnected
5. Status of ISDN layer 1 on PRI 1 (2) interfaces:
   - Shining: Layer 1 successfully established
   - Flashing: Layer 1 in the establishing process
   - Light off: Layer 1 disconnected
6. Physical RJ45 connectors for ISDN PRI 1 and PRI 2 interfaces. Before you plug in your ISDN connection please check whether the wiring configuration matches the ISDN connection requirements!

Tip

- The LED statuses provide basic information on the ISDN interface only. For details on the ISDN interface state refer to the web interface.

Configuration Jumpers



There are three configuration jumper blocks on the PRI board. JP2 and JP3 are used for hardware switching of the ISDN PRI connector into the TE / NT configuration. This operation means only swapping of the transmitting and receiving connector pairs, the interface configuration must be made using the web interface. With jumper JP4 you can activate/deactivate the back–up connection between PRI 1 and PRI 2 in case the system is switched off or the PRI board is not handled by system.

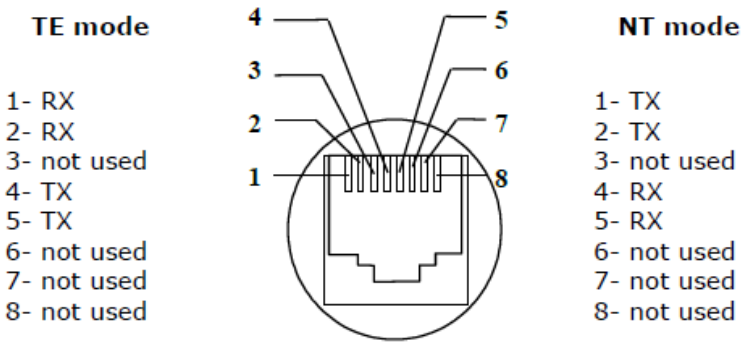
Warning

- The back–up connection (JP4) works only in case the wire settings of PRI 1 (JP3) and PRI 2 (JP2) are set in the opposite way (e.g. PRI 1 as NT, PRI 2 as TE).

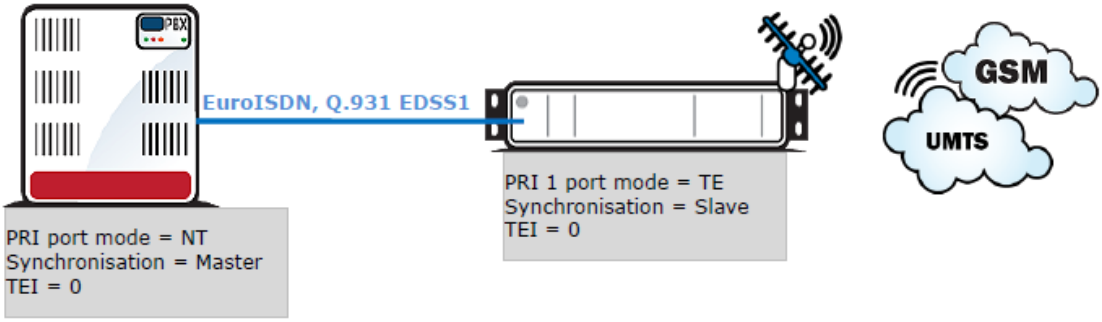
Note

- Boards with just one PRI interface (1PRI boards) have the same settings as the PRI 1 interface on 2PRI boards. And there is no back–up connection (JP4) either.

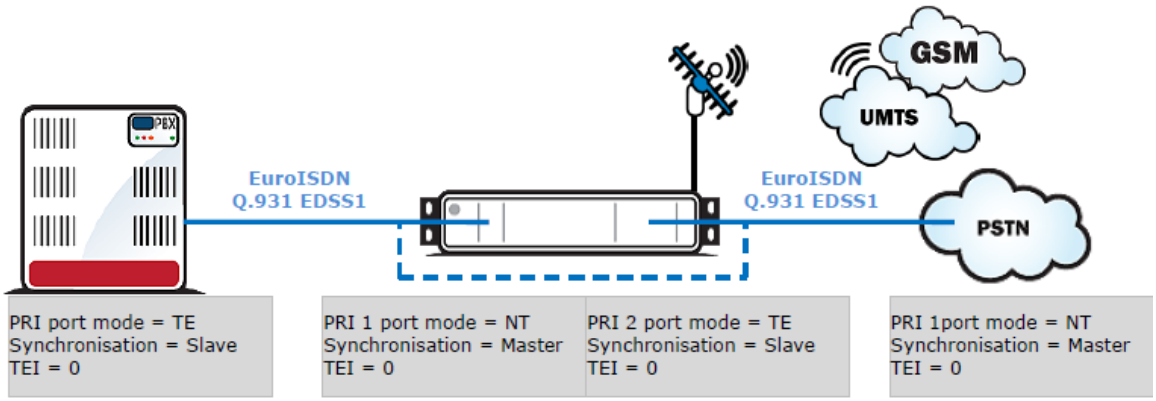
Positions of Tx and Rx Wires



Example of Connection with 1ISDN PRI Board



Example of Connection with 2ISDN PRI Board



ISDN PRI connection between two PRI interfaces

Back-up-connection of the 2PRI board

Warning

- The ISDN port mode (TE or NT) and synchronisation type (Master/Slave) must be different on the PBX (PSTN) and on the gateway. The TEI number must have the same value (default = 0).

VoIP Board

Board Description

The VoIP board contains a digital signalling processor (DSP), 4x10/100BaseT Ethernet switch and a small carrier board with the licence chip. The main board is designed on a 6–layer PCB of the size of 160x100mm. Two board status LED indicators are located on the front panel. Configuration (e.g. used voice codecs, IP setting) is completely managed by the main CPU and made via a standard web interface. There is no fixed memory (EEPROM) for the VoIP card firmware. The firmware is saved on the basic CPU and uploaded to the VoIP card upon every VoIP card start / restart.

1. PWR – board supply indication
   - Shining: Switched on
   - Flashing: Board in the sleep mode
2. INIT – board initialisation indication
   - Shining for two minutes: Firmware uploading and configuration in progress
   - Continuous shining: Board initialisation failure
   - Light off: Board initialised successfully
3. Four RJ45 connectors of the internal 10/100BaseT Ethernet switch

The VoIP board is designed as a media gateway. It works only with media packets (RTP); signalling packets (SIP) must be routed to the basic CPU IP address.

Tip

- You have to restart the VoIP card upon any VoIP configuration change.

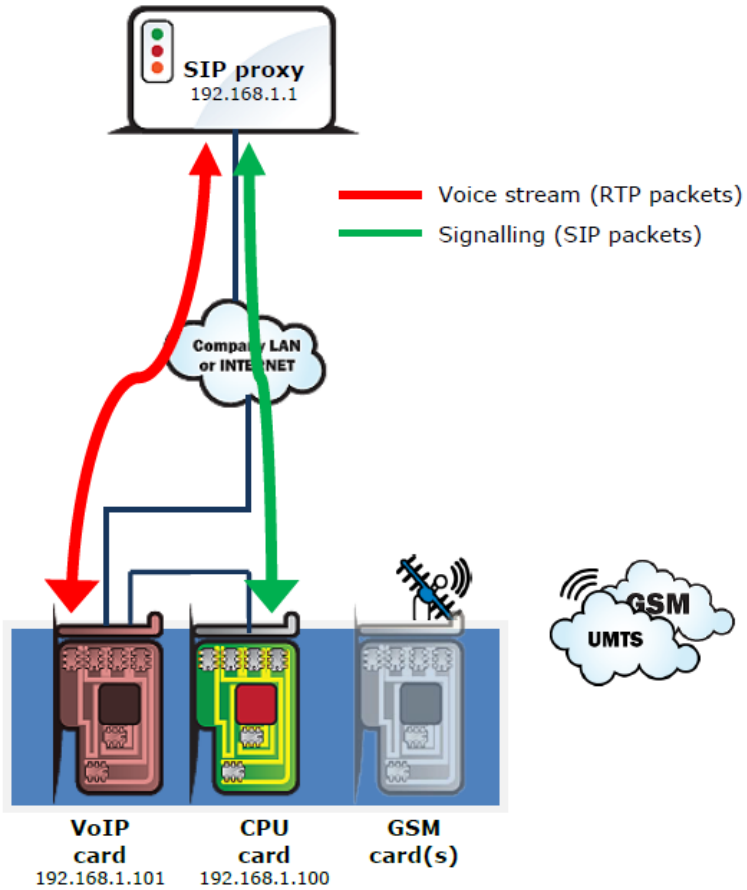
Caution

- For a successful VoIP card initialisation, the VoIP board MAC address has to be filled in correctly and the basic CPU must be switched to the VoIP–SIP mode and contain the VoIP firmware file.
- The integrated Ethernet will not work until the VoIP card has been initialised successfully.

Configuration Jumpers

There are no configuration jumpers on the VoIP card.

Example of Correct VoIP Interface Connection



2N® StarGate / BlueTower

2.2 Antenna and Antenna Splitters

2N offers several antenna splitter and antenna models providing the best signal quality on all GSM / UMTS engines. All the systems are designed for all UMTS and GSM networks.

Antenna Splitter

The antenna splitter is designed for decreasing the number of antennas, antenna cables, outdoor antennas and roof mounting space. The antenna splitter is a passive unit suitable for GSM / UMTS gateways. The antenna splitter can be external (**2N® StarGate**) or internal (**2N® BlueTower**). Each splitter consists of one or more passive units, each of which has four / two inputs and one output.

Number of inputs	Number of outputs	Input–Output insertion loss	Unit high
32	2	<15 dB	2U
32	4	<11 dB	2U
32	8	<8 dB	2U
16	1	<15 dB	1U
16	2	<11 dB	1U
16	4	<8 dB	1U
12	3	<8dB	1U

Table: Standard External Antenna Splitter Configurations

Number of inputs	Number of outputs	Input–Output insertion loss	Unit high
4	1	<	3U

Table: Internal Antenna Splitters for **2N® BlueTower**

Parameters	Value	Note
Connector type		
Input connector	SMA type, female	
Output antenna connector	N type, female	
RF parameters		
Impedance	50 Ohm	
Frequency	850 – 2100 MHz	
Insertion loss	< 8, 11, 15 dB	According to configuration
Isolation between two channels	> 20 dB	
Output overvoltage protection		
Device type	**Gas surge arrester**	
Protected voltage level	90 V	
Peak current	10 KA	
Insertion loss	0.2 dB	

Table: Technical Parameters of Antenna Splitters

Splitter Examples

Figure: Internal Antenna Splitter for **2N® BlueTower**

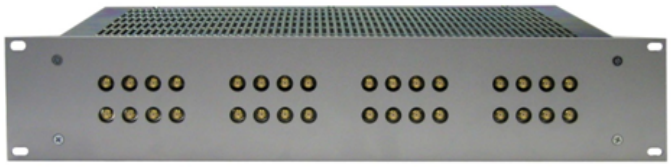


Figure: External Antenna Splitter for **2N®StarGate**

Insertion Loss Measurement

Directional Antenna

The high–gain directional YAGI antenna is suitable for outdoor and indoor use.

Type	CPY 9214
Number of elements	14
Frequency	824 – 896, 1770 – 2100 MHz
Gain	9.5 dB / 13 dB
Cable	RG 58, 10m
V.S.W.R	< 1.5 : 1
Connector	N type, female

Table: Basic Parameters of Directional Antenna

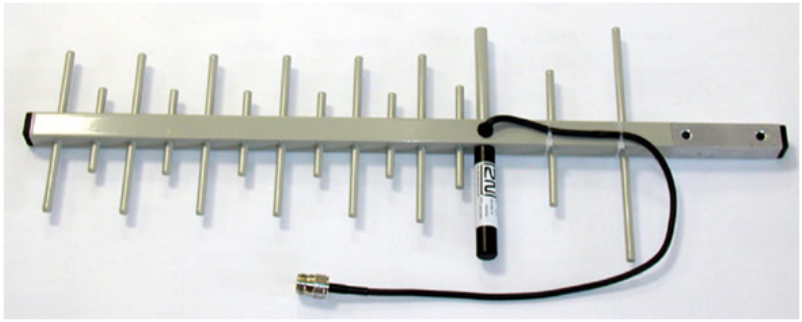


Figure: Directional Antenna

Figure: Example of Correct Installation of Directional Antennas

Warning

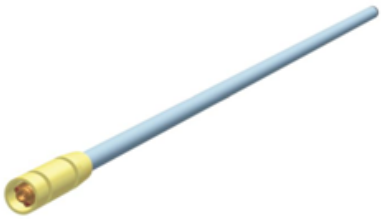
- The antenna has to be placed in accordance with the applicable overvoltage protection and grounding safety rules.

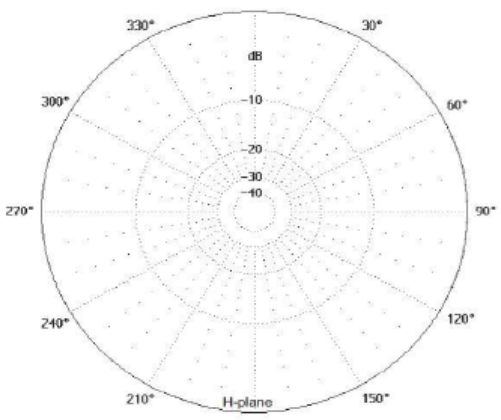
Omni-Directional Antenna

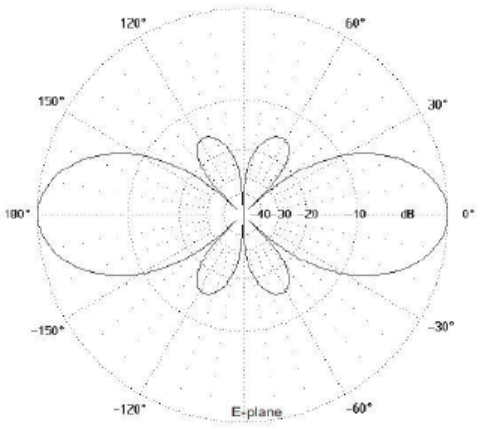
The omni–directional antenna is suitable for outdoor use.

Type	KA 2290. 9214
Frequency	870 – 960, 1710 – 2170 MHz
Gain	3 dB
Polarization	Vertical
Radiation angle in E–plane	30°
Radiation angle in H–plane	omni–directional
V.S.W.R	< 1.7
Length	420 mm
Weight	0.6 kg
Connector	N female

Table: Basic Parameters of Antenna







Discreet Antenna

The small omni–directional antenna is designed for indoor use and provides a good GSM / UMTS signal quality.

Type	Car antenna
Gain	2.5dB
Cable	Coax cable 174A (5 m)
Connector	SMA (male)

Table: Basic Parameters of Discreet Antenna

Figure: Discreet Antenna

Directional Antenna Connection Cable

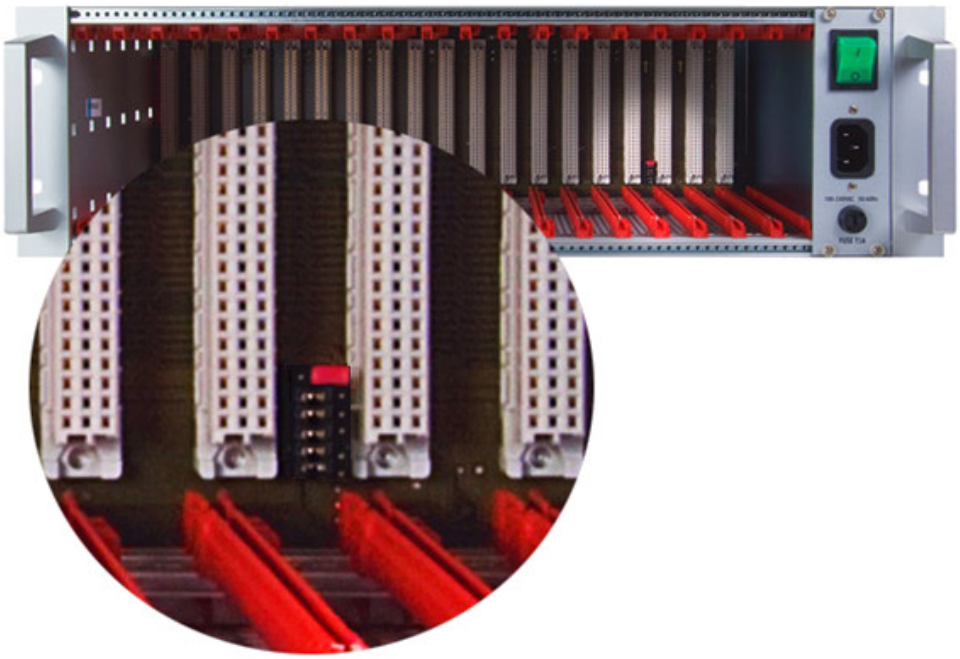
2N offers you a special low-attenuation cable in variable lengths. The cable terminating connectors are of the N type.

Type	H1000 PE coax cable
Impedance	50Ω
Operating frequency	5 – 2150 MHz
Used connectors	N type (female)
Cable size	10.3mm
Operating temperature	–40°C to +80°C
Total weight	120g / m
Minimum installation temperature	–5°C
Minimum static bend radius	75mm
Attenuation at 860MHz	14.1dB / 100m
Attenuation at 1000MHz	15.3dB / 100m
Attenuation at 1750MHz	21.3dB / 100m
Attenuation at 2050MHz	23.4dB / 100m

2.3 Gateway Rack Configuration

The **2N® StarGate / BlueTower** gateways use different hardware rack types. For detailed information on the differences refer to the 1.2 System subsection All the systems can be distributed with a VoIP, ISDN or VoIP+ISDN interface. The main back bus located in the gateway hardware rack is pre–configured to a defined type of interface (VoIP, PRI and VoIP+ISDN). There are six jumpers on the main bus between the 3rd and 4th connector (from the right).The jumper lay-out shown below applies to all the connection types (VoIP, ISDN, VoIP+ISDN).

- Keep the jumpers connected as shown below to make your system work properly.



There are three setting options:

1. ISDN: The gateway is configured to work with the ISDN PRI card only as shown in the figure below:

2. VoIP: The gateway is configured to work with the VoIP card only as shown in the figure below:

3. VoIP+ISDN: The gateway is configured to work both with the VoIP and ISDN PRI cards.

Caution

- Wrong jumper positions may cause malfunction of the whole system! Please make changes only if the system is powered off!

Note

- The jumper settings are identical for all the gateway types (**2N® StarGate / BlueTower**).

2.4 Installation

Product Completeness Check

Before installing this product, check whether the delivery is complete according to the following packing list and read this manual thoroughly. The manufacturer cannot be held responsible for any damage incurred due to an incorrect use of this product in contradiction with this manual. The warranty terms do not cover damage to the product caused by rough handling, incorrect storage or exceeding the quoted technical parameters.

Item	Rack with AC power supply	Rack with DC power supply
Power cable 2.5m	1	–
Mounting set	1	1
Quick Start manual	1	1
Serial 9F–9F cable	1	1

Table: Basic Packing List Items

Included device	1PRI card	2PRI card	VoIP card	Basic CPU card	Enhanced CPU card
Ethernet cable 3m	1	2	1		
Ethernet cable 0.6m				1	2

Table: Additional Packing List Items

Tip

- The packing lists are the same for all the gateway types (**2N® StarGate/ BlueTower**).

Installation Conditions

The following conditions must be met during system installation:

- Appropriate location (enough free space).
- GSM / UMTS signal intensity (minimum recommended signal level**: –80dB**). You can use the NET monitor on a mobile phone (e.g. Nokia, Siemens) or the diagnostics screen in the web interface for measuring the GSM / UMTS signal intensity.
- Unoverloadable GSM / UMTS cells to which the gateway modules are logged in; please keep in mind that up to 30 calls are set up at a time during full traffic

(according to the gateway configuration).

- No strong electromagnetic radiation is allowed on the system installation site.
- No strong electromagnetic reflections are allowed on the antenna installation site.
- The ISDN PRI connection must be configured properly and meet the ITU–T Q.931–EDSS1 and related recommendations.
- The VoIP – SIP signalling must meet the required RFCs.
- Place the gateway into an environment that complies with the gateway working conditions (an air conditioned room or installation rack).
- An appropriate (according to the power supply unit used) power feeding with overvoltage protection and an on–line UPS are recommended.
- An Ethernet connection on the installation site is advisable for comfortable gateway administration.
- All the SIM cards to be used must have the same PIN code (or deactivated PIN code) and be activated by the GSM / UMTS provider.

Warning

- The outdoor antenna cable has to be connected according to the overvoltage protection and grounding safety rules.
- High temperatures on the installation site may cause short–time or permanent gateway errors!

Warning

- Do not cover the top, bottom and rear sides of the gateway to avoid overheating and gateway error!
- Protection against humidity and extreme temperatures: The appliance may never be placed close to heat sources (radiators) or places exposed to direct sunshine. Also places with high humidity (such as bathrooms and cellars), places with significant temperature fluctuation (next to doors, windows), dusty places (workshops) and places exposed to aggressive gases (accumulator rooms, boiler rooms) as well as places with intensive vibrations and places exposed to shocks (compressor rooms, heavy industrial operations) should be avoided. The system should be installed horizontally.

VoIP Connection

All the gateway types have the same features. The only difference lies in the number of simultaneous calls through the VoIP card.

Voice codec support	G.711u , G.711a , G.723 at 6.3/5.3bps , G.729a,b
Default RTP ports	8000 – 8998 (adjustable by web interface)
Supported signalling	SIP
Default IP port for signalling	5060 (adjustable by web interface)
STUN protocol	Supported IP address check
Interface for SIP	10BaseT Ethernet interface on basic CPU card
Interface for RTP streams	10/100BaseT Ethernet interface on VoIP card
Maximum number of simultaneous calls	
2N® StarGate	30
2N® BlueTower	8

The VoIP board is designed as a media gateway. It works only with media packets (RTP); signalling packets (SIP) must be routed to the basic CPU IP address.

TIP

- You have to restart the VoIP card upon any VoIP setting change.

Caution

- For a successful VoIP card initialisation, the VoIP board MAC address has to be filled in correctly and the basic CPU must be switched to the VoIP–SIP mode and contain the VoIP firmware file.
- The integrated Ethernet will not work until the VoIP card has been initialised successfully.

ISDN PRI Connection

The gateway can contain a PRI card with one or two ISDN PRI interfaces (depends on the part number). PRI 1 is always set as an internal interface (PBX connection) and PRI 2 as an external interface (PSTN connection). The Least Cost Routing (LCR) and additional routing mechanisms are activated on the internal interface. All incoming calls to the external interface are always routed directly to the internal interface.

Interface	ISDN PRI (E1 frame)
Signalling	Q.931 – EDSS1
Signalling channel (D–channel)	16.
Network interface type	NT or TE (adjustable by web interface)*
TEI number	0 – 63 (adjustable by web interface)
CRC on Layer 1	Activated / deactivated (adjustable by web interface)*
Connector type	Switchable RJ45 (see Subs. 2.1)
Supported voice codec	G.711a**
Supported B–channel services	Only voice**

*The PRI 2 interface is always of the opposite type than the PRI 1 interface.
**Other streams are sent directly to the opposite PRI interface.

Installation Examples

There is an exact time source for synchronisation of the PRI interface lines on the PRI board. Even if you have synchronisation problems on the installation site (caused by specific and probably ill–configured PBXs with more that one active PRI interfaces), there is a solution as shown below. Before using this solution you are recommended to configure your PBX properly, or use the DialThru function. Red lines are calls to the PSTN, orange lines are calls to GSM / UMTS networks.

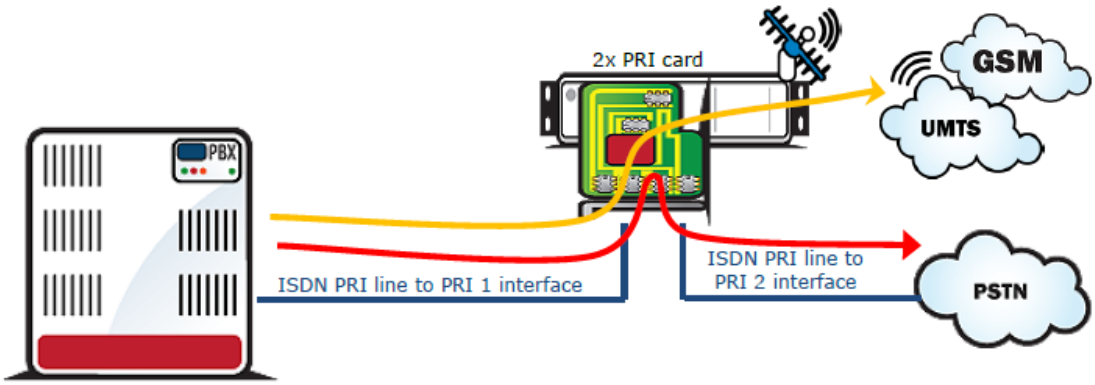


Figure: DialThru Function Installation

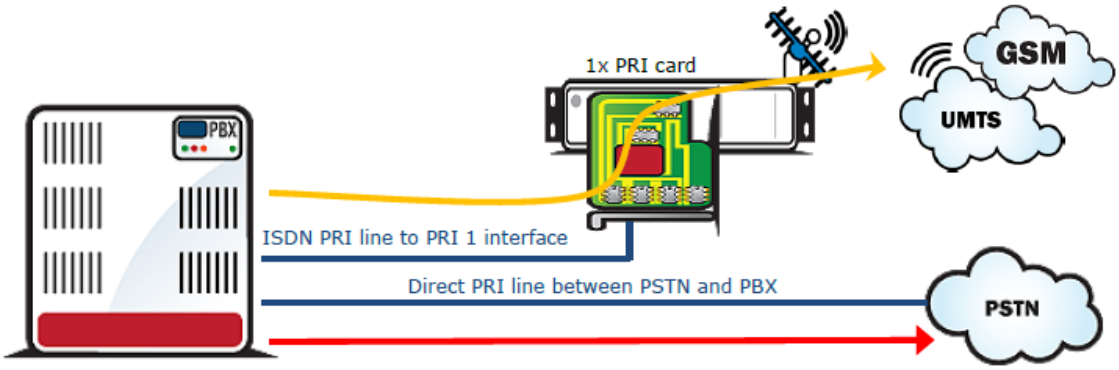


Figure: 1ISDN PRI Card Installation

External Synchronisation Option

There is an exact time source for synchronisation of the PRI interface lines on the PRI board. Even if you have synchronisation problems on the installation site (caused by specific and probably ill–configured PBXs with more that one active PRI interfaces), there is a solution as shown below. Before using this solution you are recommended to configure your PBX properly, or use the DialThru function.

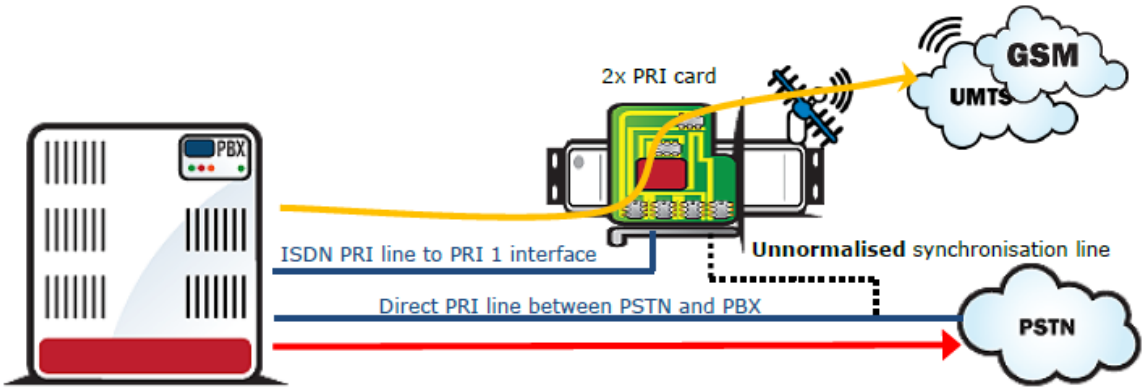


Figure: Unnormalised External Synchronisation

Connect only Tx wires to the 2PRI board because the ISDN PRI line is not designed for point–to–multipoint solutions (more than two devices on one ISDN line) like the BRI ISDN line. This solution is substandard! In case you detect a problem on the line between the PBX and PSTN (due to an additional connection to the PRI 2 interface), please disconnect PRI 2 from the line. These problems may be caused by changes in the line impedance.

Note

- Connecting Tx wires only (from the PSTN point of view) to the PRI 2 interface has no influence on signalling and voice calls. The PRI board just takes synchronisation pulses from the line.

Tip

- For an external synchronisation line you can use a standard cable with an RJ45 connector. To disconnect the Rx wires just release the defined jumpers on the PRI 2 interface on the PRI board.

Simultaneous Use of PRI ISDN and VoIP Cards

The GSM gateway enables the VoIP and PRI ISDN interfaces to be used at the same time. This configuration requires additional incoming/outgoing call routing settings.

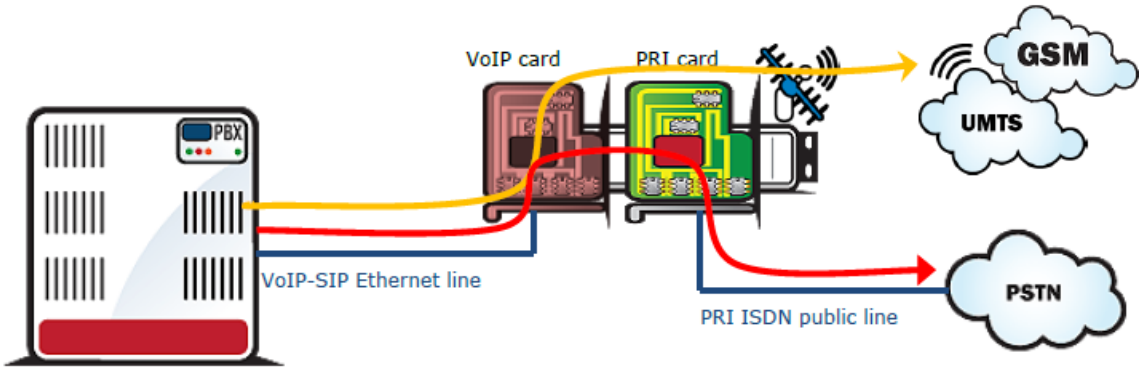


Figure: Installation with SIP proxy (Cisco Call Manager).

Licence Limitations

Some of the 2N products have time–limited software licences (e.g. DSS1 signalling, etc.). Moreover, every gateway restart adds one hour to the internal licence counter. To see the current licence status, use the CPU web interface (the standard licence validity is 850 hours).

You are recommended to contact your dealer before licence expiration to request for a new licence key to increase the gateway using time.

To upload a new licence code, use the CPU web interface.

Caution

- A gateway with an expired licence fails to accept calls from the VoIP/GSM/UMTS/PRI interface because the call control layer is deactivated.

GSM / UMTS Network Restriction

Upon the dealer's request, 2N can activate restrictions of use for selected wireless networks only. Thus, the gateway will be unable to log in successfully to the restricted wireless networks. This state is signalled by the red status LEDs on the GSM / UMTS cards and the 'netw–err' message on the web interface diagnostics screen.

Tip

- To prevent this problem consult ask your dealer.

Basic CPU Firmware

Before installing your **2N® StarGate / BlueTower** gateway, please upload new firmware to both the CPUs. Find the latest firmware version plus all software on the enclosed CD or on our website www.2N.cz.

Warning

- To avoid gateway error please use only the firmware files that are designed for your type of gateway and certified by 2N.

Follow the instructions below to download firmware easily using the gateway web interface:

- Connect your PC and the gateway into the Ethernet network.
- Open the web browser (MS Internet Explorer 9 and higher or Mozzila Firefox 4 and higher are recommended).
- Enter http://IP_address to register to the web interface.
- Click on Upgrade, then on Browse and select the new firmware file.
- Click on the Download firmware icon in the lower part of the web page.
- **2N® StarGate / BlueTower** will upgrade the firmware automatically.

Tip

- You can also use **2N® SIM Star Server** for remote upgrades for all connected gateways.

Potential Problems of GSM / UMTS Networks

The 2N gateway works reliably even under a 100% load. The following problems may be caused by GSM networks:

- **Wireless modules cannot log in, log in slowly, or log out occasionally. This problem may be caused by any of the following situations:**
  - The GSM / UMTS signal is low. We recommend the minimum signal level of approximately –80dBm. If lower, you have to change the antenna or gateway location!
  - The GSM / UMTS cell (BTS) to which the wireless module is trying to log in

is overloaded. If you use directional antennas, you can direct them to more GSM cells than one. The possibility to choose a cell by antenna directing is considerably limited or eliminated in towns or densely populated areas where multiple signal reflections occur. It is also difficult to select a cell where the cells lie in a straight line before and behind the antenna. If no selection can be made, you have to use another available GSM / UMTS provider.

Caution

- You are recommended to use 32 channels at most on one installation site for one GSM / UMTS provider to avoid wireless network overload problems on the installation site.

- **Some wireless modules are permanently logged–out from the network or fail to receive incoming calls:**
  - The problem indicates a wireless network overload due to heavy traffic. You can eliminate this problem by setting the **GSM basic parameters – Call delay** parameter in the web interface to '2 seconds'. This parameter extends the delay between the end of one call and the start of another call made via one and the same wireless module.
- **Some wireless modules cannot log in to the wireless network even after reset:**
  - Your GSM / UMTS provider may have located the SIM card, but refused the login to the wireless network because either too many calls are being made using this card, or the SIM card has been logged–in to one BTS for too long. This problem can be solved by an occasional exchange of SIM cards between wireless modules.

The manufacturer cannot be held responsible for any SIM card or service blocking problems of the GSM / UMTS provider caused by the GSM / UMTS provider's breach of a SIM card term agreement.

- **DTMF transmission is not correct. Some numbers are not correctly recognized by called / calling party:**
  - DTMF tones (as all voice services) change codec during transfer to GSM / UMTS network voice channel (this codec change caused partially information lost which depends on used type of GSM/UMTS codec in wireless part of the network). To improve success rate of transferred tones, please check audio quality / level of called + calling party ; audio settings of opposite party; change source of DTMF tones (different length and volume can improve probability of successful DTMF transmission) or use DTMF transfer not in voice channel, but in signaling channel (regarding RFC XXXX). Refer to the Gateway Control - GSM Basic Parameters subsection for small changes in audio levels.

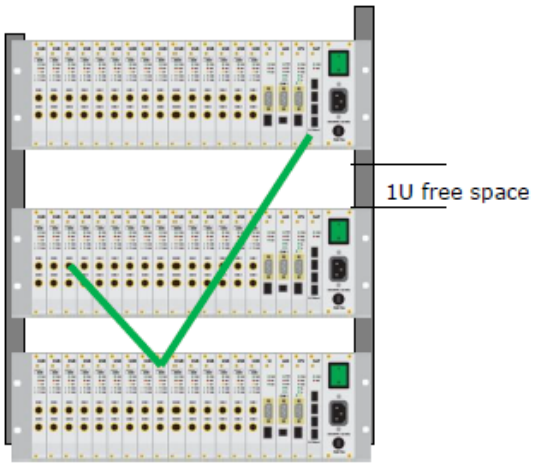
Note

- Settings of GSM network and opposite called / calling party can involve DTMF transfer. 2N cannot guarantee successful DTMF transmission with using 2N GSM/UMTS gateway with PRI ISDN interface (where only voice channel transport of DTMF is allowed).

Mounting

2N recommends installing the gateway in a well ventilated area (rack) according to the installation conditions. The **2N® StarGate** gateway is designed for rack installation with the minimum rack depth of 400mm and 3U (132mm). **2N® BlueTower** is to be installed into a rack shelf.

To prevent gateway overheating, you are recommended to install the gateway into a rack with 1U free and uncovered space above and below the gateway (see the figures below):



Warning

- Do not cover the top, bottom and rear sides of the gateway to avoid overheating and gateway error!
- Protection against humidity and extreme temperatures: The appliance may never be placed close to heat sources (radiators) or places exposed to direct sunshine. Also places with high humidity (such as bathrooms and cellars), places with significant temperature fluctuation (next to doors, windows), dusty places (workshops) and places exposed to aggressive gases (accumulator rooms, boiler rooms) as well as places with intensive vibrations and places exposed to shocks (compressor rooms, heavy industrial operations) should be avoided. The system should be installed horizontally.

Main Installation

- Place the gateway into an environment that complies with the gateway working conditions.
- Configure the gateway properly using the configuration software included.
- The gateway mains supply must be backed–up and overvoltage–protected (a line–interactive or on–line UPS is recommended).
- Any of the available remote control tools (ISDN line, analogue line, Ethernet) are advised for a more comfortable gateway administration.

Control Ways

The system can be supervised and controlled locally or remotely as follows:

- Local control using a PC connected by a standard full crossed serial cable.
- Remote connection over the IP network using the Telnet protocol or web interface.
- Remote connection over a data call to the ISDN PRI interface (**not supported at present**).

Configuration Ways

The system can be configured by any of the following ways:

- Using extended AT commands (refer to the 4. List of AT Commands subsection).
- Using the CPU web interface.

3. Configuration

This section describes configuration of the **2N® StarGate/BlueTower** product.

Here is what you can find in this section:

- 3.1 Important Default Settings
- 3.2 Quick Step-by-Step Manual
- 3.3 Web Configuration Interface
  - Gateway Control
  - Gateway Configuration
  - Messaging
    - SMTP/POP3 Basic Configuration – Step by Step
    - SMPP Basic Configuration – Step by Step
  - Monitoring
  - Others
- 3.4 Enhanced CPU Configuration
- 3.5 2N® External Routing Machine
- 3.6 2N® SIM Star System

3.1 Important Default Settings

The following table shows the default values of important parameters:

Parameter	Value
IP address of basic CPU	192.168.1.2
IP mask of basic CPU	255.255.255.0
IP address of gateway	192.168.1.1
IP address of VoIP board	0.0.0.0
IP mask of VoIP board	Same as basic CPU configuration
IP address of enhanced CPU	By DHCP server
IP mask of enhanced CPU	By DHCP server
Username / Password of basic CPU	Admin / 2n
Username / Password of enhanced CPU	Admin / 2n
Username / Password of ERM	Admin / 2n
Transmission rate RS232 of CPU	57600bps
Transmission rate RS232 of eCPU	115200bps

Caution

- To prevent unauthorised access please change the default access username and password as soon as possible!

For default reset, use the JP1 jumper for the CPU and JP2 jumper for the eCPU.

CPU Factory Reset

Follow the instructions below to set the default values for the CPU:

- Switch off the GSM gateway.
- Remove the CPU card and connect JP1 to the DEF position.
- Insert the CPU card and switch on the GSM gateway.
- Wait for one minute and switch off the GSM gateway again.
- Remove the CPU card and reconnect JP1 to the CPU/eCPU position.
- Insert the CPU card and switch on the GSM gateway.

Now the factory settings are restored on the CPU.

Enhanced CPU Factory Reset

Follow the instructions below to set the default values for the eCPU:

- Switch off the GSM gateway.
- Remove the CPU card and connect JP2.
- Insert the CPU card and switch on the GSM gateway.
- Wait for one minute and switch off the GSM gateway again.
- Remove the CPU card and release JP2.
- Insert the CPU card and switch on the GSM gateway.

Now the factory settings are restored on the enhanced CPU.

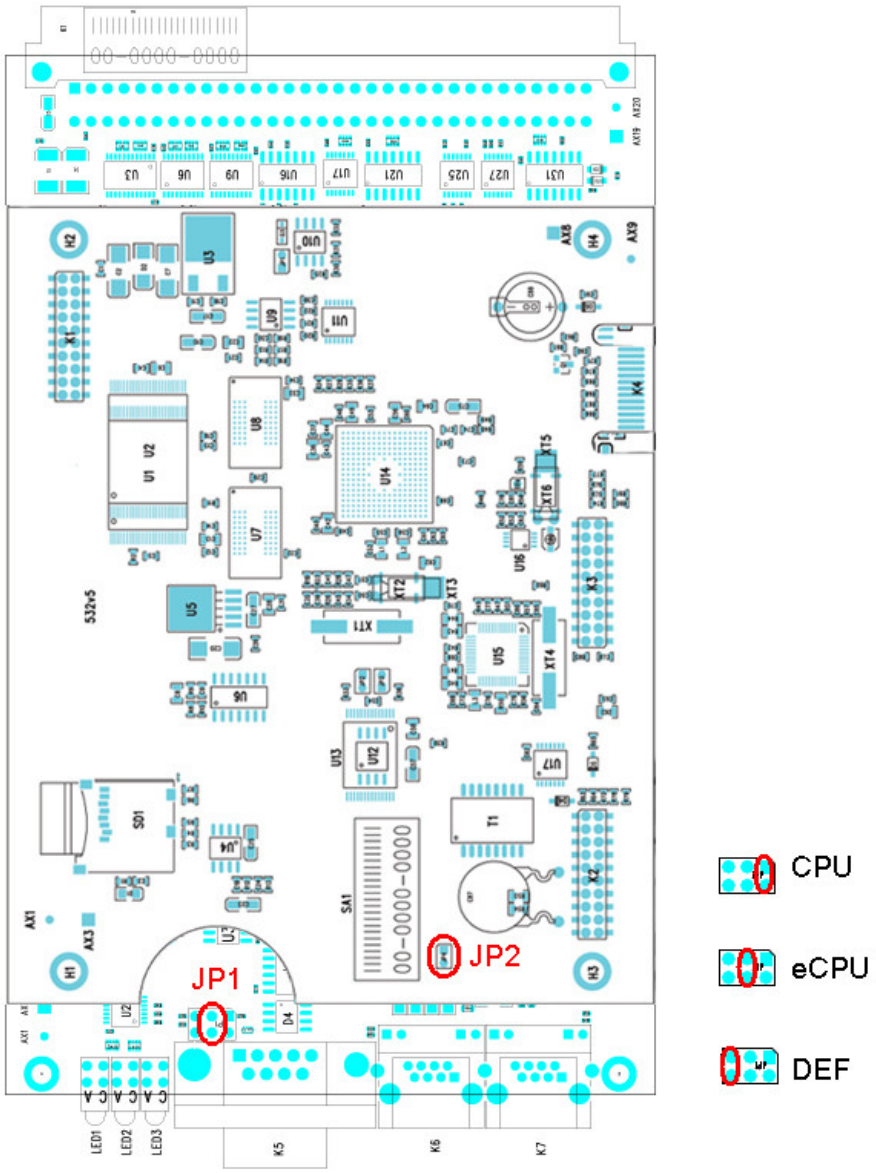


Figure: Configuration Jumpers

3.2 Quick Step-by-Step Manual

The following quick guide is intended for installation of a gateway with basic features only. For full configuration please read the whole user manual carefully. For a successful installation of the whole system we recommend you to have a training certificate from 2N.

Warning

- All SIM cards must have the same or disabled PIN code! The same PIN code must be defined in the gateway configuration.

Basic Configuration – Step by Step

This section will help put your **2N® StarGate / BlueTower** gateway in operation for the first time. Refer to the 3.3 Web Configuration Interface subsection for detailed settings.

- Install the GSM gateway as instructed in the 2.4 Installation subsection. Before the first start, remove the SIM cards, or insert the SIM cards with the PIN request disable.
- Connect the GSM gateway to the Ethernet network to enable connection to the address mentioned in the 3.1 Important Default Settings subsection from the configuration terminal. If the gateway default IP address is not suitable for your Ethernet installation, reset the IP address as follows:
  - Disconnect the configuration terminal from the Ethernet network.
  - Disconnect the GSM gateway from the Ethernet network.
  - Prepare the Ethernet switches, or an Ethernet crossed cable.
  - With the Ethernet crossed cable, interconnect the configuration terminal with the GSM gateway directly.
  - With the Ethernet switch, connect the configuration terminal and GSM gateway to the pre–prepared Ethernet switch. We do not recommend connecting any other equipment.
  - Change the Ethernet IP setting in the configuration terminal, e.g.: IP=192.168.1.200, Net Mask: 255.255.255.0.
  - Open your web browser and enter the GSM gateway IP address.
  - Enter the factory login data.
  - Change the required settings in the **Gateway configuration**, **Ethernet configuration** menu and store the data into the GSM gateway.
  - Connect the GSM gateway to a standard Ethernet network.
  - Restore the configuration terminal IP setting and connect the configuration terminal to a standard Ethernet network.
  - Enter the new GSM gateway IP address to get connected to the web interface.
- Enter the current time and date in the **Gateway control**, **Date/Time** menu for the GSM gateway.
- Make sure that the **Licence status** item is **unlocked** in the **Gateway control**, **Firmware/Licence** menu. If not, your GSM gateway does not contain the licence. Contact your dealer for the licence key.
- Set the correct PIN value in the **Gateway configuration**, **System parameters**

menu. The value must comply with the SIM card PIN value.
- Set new login data in the **Gateway configuration**, **Login configuration** menu.
- Switch the GSM gateway off and insert the SIM cards. Connect an antenna to the GSM gateway and switch it on.
- The GSM gateway factory configuration allows you to make outgoing calls without any additional programming. All you have to do is set the correct values for the PRI ISDN and VoIP interfaces.

From now on, **2N® StarGate / BlueTower** will be ready to receive VoIP/ISDN calls and route them to GSM/UMTS networks. If all the GSM modules are occupied, or logged out, the GSM gateway will reject all VoIP/ISDN and GSM/UMTS calls.

Should you get in troubles, follow the steps below please:

- Read the User Manual carefully and check all parameters.
- Find answers to the frequently asked questions at http://faq.2n.cz.
- Consult your servicing partner.

You are recommended to attend a 2N certified training to improve your installation chances.

3.3 Web Configuration Interface

Essential Data

The **2N® StarGate / BlueTower** web interface supports the following web browsers:

MS Internet Explorer v9

Mozilla Firefox v4 and higher

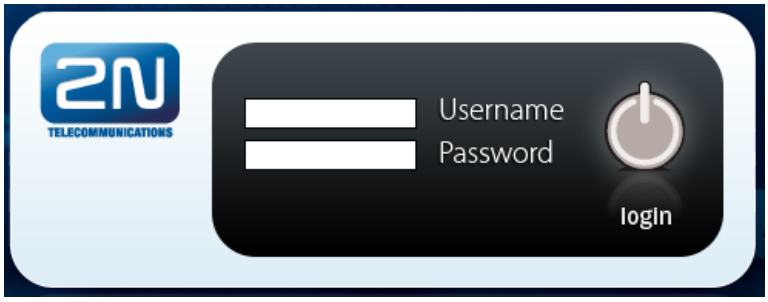
Any other web browsers may cause troubles. The recommended screen resolution is 1280x1024 and colour quality 32bit or higher. The configuration interface is available in the English language version only at present.

Tip

- Use the F11 key to activate the full–screen mode for better resolution.

Login

For login to the **2N® StarGate / BlueTower** web configuration interface, enter the server IP address into your web browser. The following login dialogue will get displayed.



Tip

- The user limitation applies to the web interface access only. The access to the Telnet interface is limited to ten simultaneous users.

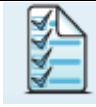
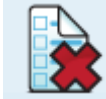
Just one user may be logged in at a time. Refer to the 3.1 Important Default Settings S ubs. for details on the login factory settings.

A five–minute login timeout is set automatically and recovered automatically upon every user activity on the web interface. After this timeout, the current user is logged out automatically. Click on the **Refresh** button to reset the maximum timeout value.

Tip

- Set the login timeout value in the Gateway Configuration - Web Configuration logout section.

Web Icons

Icon	Description
	Reset factory values
	Store current configuration into GSM gateway
	Restore previous GSM gateway configuration values
	Save onto local disk of connected terminal
	Refresh display data
	Confirmation (e.g. of configuration file storing to GSM gateway)

Caution

- Push the Save settings button to save the changes. Otherwise you will lose the configuration changes after quitting the current configuration window!

Home Page

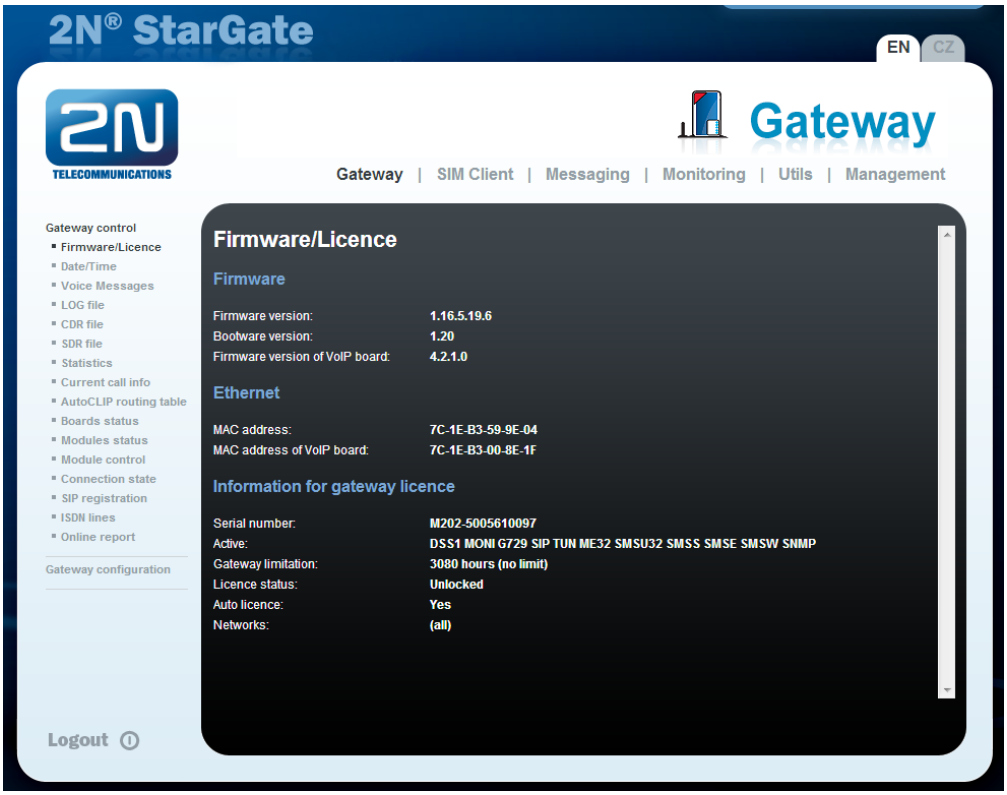
Having logged in, you get to the **Gateway** home page as shown in the figure below. There is a menu on the left, which includes the Gateway control and Gateway configuration items. The right–hand upper corner displays the current state of the login timer and the **Refresh** button for automatic time limit refreshing.

The home page also includes the Logout button. You wil be notified of successful logout after every logout action to avoid re–use of your login data.

There are five more sections in the right–hand upper menu:

- **SIM client –** for connection to the **2N® SIM Star** system.
- **SMS –** for receiving/sending SMS via the web interface.
- **Messaging** – for receiving/sending SMS via SMPP or SMTP/POP3
- **Monitoring** – for gateway monitoring via SNMP
- **Utils –** including extending system tools (Network capture, Report capture).
- **Management –** for firmware update, license upload and configuration upload/download.

The main window displays information on the gateway licence status, firmware and bootware versions and the **2N® StarGate / BlueTower** Ethernet interface MAC address. In addition, you can download a new licence here.



Gateway Control

This group helps:

- Monitor the current statuses of the GSM gateway components;
- Check and set the GSM gateway licence;
- View and save LOG files and CDR.

Firmware / Licence

This window provides information on the gateway licensing, firmware and bootware versions and Ethernet interface MAC address. Use the web interface to download a new licence via **Management–>Licence.**

- **Firmware version** – current firmware version of the gateway connected.
- **Bootware version** – current bootware version of the gateway connected.
- **Firmware version of VoIP board** – current firmware version of the VoIP board connected.
- **MAC address** – Ethernet interface MAC address of the gateway connected.
- **MAC address of VoIP board** – Ethernet interface MAC address of the VoIP board connected.
- **CPU serial number** – GSM gateway serial number in the format M202–xxxxxxxxxx
- Active: licensed protocols:
  - **SIP** – SIP support.
  - **G729** – G.729ab voice codec support.
  - **TUN** – GSM–CSD remote supervision support.
  - **DSS1** – ISDN BRI DSS1 protocol support.
  - **MONI** – ISDN monitoring support.
  - **SMSU –** count of SMS users.
  - **SMSS –** SMPP support.
  - **SMSE –** SMS@email support.
  - **SMSW –** SMS via web support.
  - **SNMP –** SNMP monitoring support.
- **Gateway limitation** – gateway operation time (licence limitation if any).
- **Licence status** – current licence status (unblocked/blocked).

> **Caution**
> - When the licence code expires, the licence–based protocols will be locked!

- **Networks** – displays the list of allowed/disallowed GSM/UMTS networks.

> **Caution**
> - Upon the dealer's request, the gateway may contain blocking of certain GSM/UMTS networks. This state is indicated by a red shining Ch 1 / Ch 2 LED on the GSM/UMTS board. The GSM module diagnostic window displays the „netw–err status.
> - Contact your dealer for more information please.

Date / Time

The Date / Time window enables you to set the current date and time for the gateway. Select the **Synchronise with local PC** item and the **Time** and **Date** items will be set automatically according to your PC data.

Caution

- The internal back–up source is able to back up the internal clock source for a few hours only! Make sure that the gateway date and time values are correct after a long disconnection from the power supply!

Voice Messages

This window is used for recording, checking and downloading voice messages. Support ed format is PCM–Alaw, Mono, 8000 Hz, 8 bits.

Index	Type of message	Use	Max. length(s)
0	**DISA message**	Incoming calls from GSM/UMTS	64
20	**PRI 2 message**	Message to PRI 2 in case of deactivated PRI 1	16
21	**GSM outgoing group 1**	Outgoing calls via GSM group 1	8
22	**GSM outgoing group 2**	Outgoing calls via GSM group 2	8
23	**GSM outgoing group 3**	Outgoing calls via GSM group 3	8
24	**GSM outgoing group 4**	Outgoing calls via GSM group 4	8
25	**GSM outgoing group 5**	Outgoing calls via GSM group 5	8
26	**GSM outgoing group 6**	Outgoing calls via GSM group 6	8
27	**GSM outgoing group 7**	Outgoing calls via GSM group 7	8
28	**GSM outgoing group 8**	Outgoing calls via GSM group 8	8
30	**Message 30**	Voice message detector	8
31	**Message 31**	Voice message detector	8
32	**Message 32**	Voice message detector	8
33	**Message 33**	Voice message detector	8
34	**Message 34**	Voice message detector	8
35	**Message 35**	Voice message detector	8
36	**Message 36**	Voice message detector	8
37	**Message 37**	Voice message detector	8

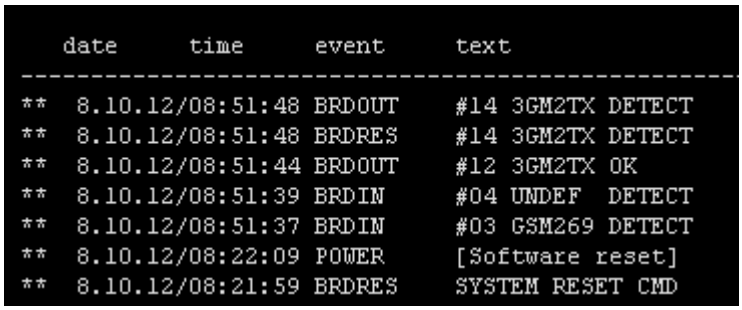
You can choose which message will be uploaded or use detection by file name. Detection requires file name: "mess[index of message][optional remark].wav". You can upload more than one message in .tar file.

Note

- The PRI 2 connection message will be played only if the B–channel is opened.
- Voice messages with indexes 30 – 37 are used for detection of the mobile provider's voice message played before call connection. If a match is found of the voice message with any of the voice messages recorded in the gateway, the call is terminated automatically or established via the last GSM outgoing group set in the LCR table (on condition that the ITD – Ignore tone detection in last group parameter is active) in the **Gateway Configuration–>LCR table** section. Refer to the **Gateway Configuration–>GSM basic parameters–>Voice message detector settings** for details.

LOG File

The LOG file window helps read out the gateway LOG file. The bottom part of the window includes icons for saving the LOG file into a file and refreshing the LOG listing in the web window.



	date	time	event	text
**	8.10.12	08:51:48	BRDOUT	#14 3GM2TX DETECT
**	8.10.12	08:51:48	BRDRES	#14 3GM2TX DETECT
**	8.10.12	08:51:44	BRDOUT	#12 3GM2TX OK
**	8.10.12	08:51:39	BRDIN	#04 UNDEF DETECT
**	8.10.12	08:51:37	BRDIN	#03 GSM269 DETECT
**	8.10.12	08:22:09	POWER	[Software reset]
**	8.10.12	08:21:59	BRDRES	SYSTEM RESET CMD

Refer to the 5.4 List of LOG Events subsection for more details.

CDR File

The CDR file window helps read out the Call Data Records (CDR) of the gateway. The bottom part of the window includes icons for saving the CDR into a file and refreshing the CDR listing in the web window. Refer to Subs. CDR line description for more details on the CDR format.

Caution

- The maximum capacity is 962 call records. When this limit is reached, the oldest record(s) will be deleted automatically!

Module Status

This window displays the current status of each GSM/UMTS channel. Refer to the 5.1 List of Status Codes subsection for status details.

Module Control

This window helps you control the selected GSM/UMTS module manually.

- **Statuses of layers 2 and 3** – statuses of the module communication layers
- **Network name** – name of the network where the module is currently logged in
- **Network ID** – ID number of the network (MCC+MNC) where the module is currently logged in
- **Network cell** – identification number of the GSM cell the module is currently logged in to.

Displayed code numbers in the A,BBB,CCC,DDDDD format are received from the wireless engine:

A = Status of wireless part:
0 – The wireless engine is currently not registered
1 – The wireless engine is registered to the home network
2 – The wireless engine is not registered, but is searching for a new provider
3 – The wireless engine registration was denied by the network
4 – The unknown reason
5 – The wireless engine is registered to a roaming network

BBB = LAC (Location Area Code) first byte in DEC format; CCC = LAC second byte in DEC format; DDDDD = cell identification code

- Registration to a roaming network is restricted by default. For roaming enable refer to Subs. Gateway Configuration.
- Upon the dealer's request, 2N can activate the restriction of use for selected wireless networks only. Thus, the gateway will be unable to log in successfully to the restricted wireless networks. This state is signalled by the red status LEDs on the GSM / UMTS cards and the „netw-err message on the configuration tool diagnostics screen.

- **Signal** – signal level
- **Module ID** – International Mobile Subscriber Identity (IMSI) or SIM card ID (SCID)
- **Module firmware** – wireless engine module firmware revision number
- **Module IMEI** – wireless engine international identification number
- **Number of active SIM card positions**

Statistics

The window displays the current statistics on calls. The bottom part of the window includes icons for saving the LOG file into a file and refreshing the CDR listing in the web window. Refer to Subs. Statistics for format information.

Current Call Info

The window displays the currently made calls. The bottom part of the window includes icons for saving the LOG file into a file and refreshing the listing in the web window.

Connection State

The window displays the states of all available configuration sessions. The bottom part of the window includes icons for saving the LOG file into a file and refreshing the listing in the web window.

AutoCLIP Routing Table

The window displays the current state of the AutoCLIP table. The bottom part of the window includes icons for saving the LOG file into a file and refreshing the listing in the web window.

Note

- The maximum AutoCLIP routing table capacity is 128 records.

SIP Registration

The window displays the current SIP registration state of the gateway.

Online Report

The window displays on–line gateway tracing.

Gateway Configuration

System Parameters

General

- **Saving call data (CDR)** – select the call types on which records are to be saved into the CDR file.
- **Gateway ID** – identifies **2N® StarGate / BlueTower** numerically in the CDR in case multiple devices generate the CDR in the network.
- **General selection of SIM** – cards Selection of the SIM card holder to be used by the gateway. This parameter has no influence on the gateways connected to the **2N® SIM Star** system.
  - **According to GSM groups** – the SIM card is selected according to the settings of the Outgoing GSM group to which the wireless module is assigned.
  - **SIM card in slot #** – hardware selection of the SIM card holder position. **This setting overrides the Outgoing GSM group setting!**
- **Number for remote control (PRI 1, PRI 2)** – The remote control number for a date call via the B–channel of the ISDN PRI 1 or PRI 2 interfaces.

Automatic Logout of GSM Modules

This function is used for automatic logout of wireless modules from the wireless network in a selected time interval. If the logged–in modules are occupied by a call, the logged–out modules log in automatically. If the traffic drops, the modules log out again from the network at random intervals.

- **Enable automatic logout** – enable/disable the feature.
- **Logout hour** – set the time interval for the wireless modules to start logging out randomly from the wireless network.
- **Login hour** – set the time interval for the wireless modules to start logging in back to the wireless network.
- **Min. logged–in modules** – set the minimum count of wireless modules that remain logged–in.

Summer / Winter Time

- **Automatically switch to summer/winter time** – enable an automatic change of the gateway system time at the time of transition to/from the daylight saving time.
- **Date of switch to winter time [dd.mm]** – transition day and month.
- **Date of switch to summer time [dd.mm]** – transition day and month.

System Restart

- **Enable system restart –** enable/disable the feature.
- **Time of system restart [hh:mm]** – set the time for system restart.

Others

- **PIN** – PIN code for the SIM cards that request the PIN code. Caution

> **Tip**
>
> - A SIM card with a PIN code other than that set in the GSM gateway configuration will be blocked with the „pin–err cause. To unblock the so–rejected SIM card, enter the correct PIN on your mobile phone!

- **End of dialling (empty=off)** – a selectable DTMF code for DTMF dialling end in the event of a DISA incoming call. The default value is „#.

List of Emergency Numbers

The window displays a list of emergency numbers, which are normally routed to the PRI interface. If the PRI line is disconnected, the emergency numbers are dialled automatically via any GSM/UMTS module according to the following rules:

- Search of a logged–in GSM/UMTS module (regardless of free minutes);
- Search of a blocked or network searching GSM/UMTS module.

The table includes an exact format of the number to be called (112,911, etc.). The 'x' placeholder stands for any digit in the number to be called. The '_' placeholder means the rest of the number. For example:

Format	Allowed numbers
123	123 only
14x0	1400, 1410, 1420, ...1490
999_	All numbers starting with 999

LED indication

- **GSM signal mode –** set the GSM module signal LED indication.
  - **None**
  - **Module1 only**
  - **Module2 only**
  - **All modules**

VoIP Parameters

VoIP Functions

- **Day of deleting statistics on VoIP (every month)** – set the day for automatic deletion of call statistics via the VoIP interface. None = statistics will not be deleted automatically.

SIP Settings

- **Use CLIP from INVITE field** – define that CLIP from the 'Contact' or 'From' field shall be used for call routing to GSM/UMTS.
- **Send 180 ringing instead of 183 session progress.**
- **Send 200 OK instead of 180/183.**
- **Send 200 OK and BYE when rejected from GSM.**
- **Send 200 OK on REGISTER request** – virtual registration of device in **2N® StarGate / BlueTower** gateway (for registration requiring equipment).
- **Replace CLIP from GSM with Caller ID.**
- **Deny DTMF according to RFC2833.**
- **Use SIP over TCP for registration.**
- **Use SIP over TCP for calls.**

SIP Registration

- **Registration expires [s]** – set the expiration time for the **2N® StarGate / BlueTower** gateway registration data with SIP proxy.
- **Reattempt registration [s]** – set the time interval after which the request shall be resent.
- **Registration domain (realm).**
- **Caller ID.**
- **Username** – registration data with SIP proxy.
- **Password** – registration data with SIP proxy.

Voice Parameters

- **First RTP port (even: 1024 – 65524)** – set the number of the first RTP port. The RTP port number must be even according to the recommendation.
- **Last RTP port (even: first RTP+10 – 65534)** – set the number of the last RTP port. The RTP port number must be even according to the recommendation. The recommended minimum RTP port range is 10

Codec Settings

Additional settings for the voice codec used. For the default settings see the table below.

Codec	Number of blocks	VAD (Voice Activity Detection)
G.711	4	Deactivated
G.729	2	Deactivated
G.723	2	Deactivated
G. 723 bitrate is 6.3 kbps		

Caution

- Using low rate codecs may deteriorate voice quality!
- You have to have a wide–band TCP/IP connection for using a high rate codec!
- You can use an Internet VoIP bandwidth calculator to calculate the actually required bandwidth (e.g. www.bandcalc.com).

Codec Priority

Set the types of the speech codecs to be preferred.

- **Priority 1**
- **Priority 2**
- **Priority 3**
- **Priority 4**

IP Addresses

- **VoIP board** – required IP address of the VoIP card of the connected gateway.
- **SIP proxy (IP–>GSM)** – the SIP proxy IP address from which **2N® StarGate / BlueTower** awaits the GSM outgoing call requests.

Tip

- If you keep the default values (0.0.0.0), **2N® StarGate / BlueTower** will receive requests from any IP address.

- **SIP proxy (GSM–>IP)** – the SIP proxy IP address to which **2N® StarGate / BlueTower** turns in the case of GSM incoming calls.
- **SIP registrar** – SIP registration server IP address.

Tip

- You can use the domain name **Registration domain (realm)** for the **SIP proxy (IP–>GSM)**, **SIP proxy (GSM–>IP)** and **SIP registrar** IP addresses on condition that you complete the domain name **Registration domain (realm)** and set the **DNS server address** properly in the **Web configuration–>Ethernet configuration** section.The **SIP proxy** and **SIP registrar** IP addresses must be set to the default value (0.0.0.0).

- **NAT firewall** – NAT firewall IP address.
- **STUN server** – STUN server IP address (Simple Traversal of UDP through NATs (Network Address Translation)) for obtaining the public IP address with which **2N® StarGate / BlueTower** operates in the Internet. You are recommended to complete this field if **2N® StarGate / BlueTower** is installed in a private network separated from the Internet via NAT or firewall. The pre–set port for sending requests to STUN is 3478.
- **Next STUN request (60–6553, 0=off) [s]** – update of information on the **2N® StarGate / BlueTower** public IP address. Use this parameter to configure the

frequency of queries routed to the STUN server.

Note

- In case the GSM gateway is installed behind the NAT, make proper routing settings in the NAT router for the relevant ports (SIP, RTP, STUN). Integrated firewalls can also affect VoIP calls!

Tip

- Should you have call troubles (such as unilateral audibility, connection errors), make sure that all the active elements on the VoIP call route have been set properly. For easy troubleshooting, try the point–to–point connection with the software IP phone (SJ phone, e.g.) in your PC and, at the same time, apply network analyser tracing (WireShark – www.wireshark.org).
- Refer to the Others - Utils subsection for easy tracing by **2N® StarGate / BlueTower**.

Tones Generated to VoIP

- **Ring tone to VoIP** – generate a ringing tone of your own, or transmit a real ringing tone from the GSM/UMTS networks.

ISDN Parameters – General

Use this window to set the PRI ISDN port parameters.

PRI Mode Selection

Here define the PRI 1 (2) ISDN port type.

- **Synchronisation** – define if the gateway will send the synchronisation clock (MASTER) or receive the synchronisation clock from the connected line (SLAVE).

PRI1 / PRI2

- **Channel number select** – define the way of occupation of B–channels on a selected ISDN PRI interface. With the UPWARDS selection, the gateway will occupy the B–channels upwardly (from the selected B–channel number to the B–channel 32). With the DOWNWARD selection, the gateway will occupy the B–channels in the descending order (from the selected B–channel number to B–channel 1).
- **Preferred channel –** select a B–channel.

Note

- The PRI 1 port is always set as internal – the LCR function is activated. The PRI 2 port is always set as external – all calls from PRI 2 are rerouted to PRI 1. The PRI 2 port has a mode opposite to that of the PRI 1 port.
- In the case of ISDN port mode change, change the selection of the ISDN PRI card jumpers, see the PRI Board subsection.

PRI1 and PRI2

- **TEI address –** The Terminal Equipment Identification number for the ISDN PRI line connected. The TEI must be identical for both devices on one ISDN PRI line. The default value is 0.
- **CRC** – Enable/disable receiving CRC on Layer 1 on the ISDN PRI interfaces (in both modes the gateway sends the CRC).

Progress Indicator Value

Define which progress element value will be sent in the selected ISDN messages. The correct setting of these parameters depends on the current settings of the opposite device (PBX / Router). This parameter is primarily designed for opening the B–channel before call connection – transferring call state tones (e.g. ringing tone) from GSM / UMTS networks. The following table contains common values of progress elements.

Value	Meaning	Event
0	No progress element sending	B–channel closed
1	Call is not end–to–end ISDN or may be in–band information	B–channel opened
2	Destination call address is non–ISDN	B–channel opened
3	Origination call address is non–ISDN	B–channel opened
4	Call has returned to the ISDN	B–channel closed
8	In–band treatment has been applied	B–channel opened
10	Delay in response at the call interface	B–channel closed

Caution

- Wrong settings of these parameters may cause malfunction of the ISDN PRI line (call connection)!

PRI Functions

- **Day of deleting statistics on PRI (every month)** – set this value to enable deletion of statistic data on x–th day of a month.
- **Digits count in SETUP (en–block)** – set the number of digits to be sent in the SETUP message as ENBLOCK. The others digits will be sent in the OVERLAP dial mode. Example of use:

  Called party number: 6012345678, digits count in SETUP = 7

Outgoing signalling messages: SETUP (contains 6012345)

INFO (6)

INFO (7)

INFO (8)

- **Receive dial number from Subaddress** – with this parameter activated, the gateway uses the digits in the Subaddress field instead of the Called party number for outgoing dialling.
- **Hungarian dial tone after 2 digits** – a specific feature designed for the Hungarian national dialling plan. The gateway activates a specific dialtone for second dialling after receiving two digits.
- **Don't send ConnectAck on TE** – when the ISDN PRI is in the TE mode, the gateway will not send the CONNECT_ACK message.
- **Use CLIR if requested from ISDN (SETUP)** – enable automatic CLIR resending to GSM/UMTS if required so by the ISDN.

Tone Signalling for Calls from ISDN

- **Dial tone to PRI1 with empty SETUP** – set the dial tone type to be generated by the PRI gateway.
- **Ring tone** – set the ring tone type to be generated by the PRI gateway.
- **Generate busy tone to PRI1** – set the busy tone type to be generated by the PRI gateway into the PRI 1 interface.
- **Generate busy tone to PRI2** – set the busy tone type to be generated by the PRI gateway into the PRI 2 interface.
- **Ring tone from PRI1 to PRI2 –** set the ring tone type to be generated by the PRI1 interface into the PRI 2 interface.

Numbering Plan Settings

- **CDN, CGN** – use these parameters to set the Numbering plan for the called (CDN) and calling (CGN) numbers.

Binary value	Decimal value	Description
0000	0	Unknown numbering plan
0001	1	ISDN/Telephony numbering plan
0011	3	Sata numbering plan
0100	4	Telex numbering plan
1000	8	National standard numbering plan
1001	9	Private numbering plan
1111	15	Reserved for Extension

ISDN Parameters – Monitoring

> **Caution**
> - This service is file-licensed. Refer to **Management–>Licence key** for the current GSM gateway licence details.

PRI1 alerts

- **Send SMS at state changes –** enable/disable alert sending upon PRI1 state change.

PRI2 alerts

- **Send SMS at state changes –** enable/disable alert sending upon PRI2 state change.

PRI common settings

- **Timeout for ISDN line deactivation detection [s]** – an SMS alert on PRI1/PRI2 deactivation is sent after this timemout.
- **Timeout for ISDN line activation detection [s]** – an SMS alert on PRI1/PRI2 activation is sent after this timemout.
- **Numbers where SMS will be sent to** – list of numbers to which the SMS alert shall be sent.
- **Text of SMS** – SMS alert text with the following parameters:
  - %P(x|y), where "x" represents any text concerning PRI1 and "y" represents any text concerning PRI2.
  - %A(x|y), where "x" represents any text for interface deactivation and "y" represents any text for interface activation.

Settings of Alive SMS interval

- **Send Alive SMS** – enable/disable sending of ALIVE SMS.
- **Time [hh:mm]** – ALIVE SMS sending time.
- **Days interval** – ALIVE SMS sending interval.
- **Numbers where SMS will be sent to** – list of numbers to which the ALIVE SMS shall be sent.
- **Text of SMS** – ALIVE SMS text.

Port Modes

This item helps you set each of your gateway ports. The settings are based on the LCR table including relevant routing/rejecting rules for all incoming and outgoing calls.

GSM Basic Parameters

Digits Dialled from VoIP

- **Minimum numbers from VoIP** – set the minimum count of digits to be dialled into the GSM network.
- **Maximum numbers from VoIP** – set the maximum count of digits to be dialled into the GSM network.
- **Wait for next digit [s]** – set the timeout for **2N® StarGate / BlueTower** gateway to wait for the next digit dialled from VoIP to GSM.

Calls

- **Relax timeout [s]** – set the timeout between the end of the last call and beginning of the next call made via one and the same GSM module (incoming and outgoing calls are rejected during this timeout). The recommended relax value is 2 seconds – please do not change this setting unless absolutely necessary.
- **Timeout for ringing to GSM [s] –** ringing timeout for outgoing calls to GSM. If not answered or terminated within this timeout, the call will be terminated automatically by the gateway when this timeout elapses.

Holiday List

List of days on which calls will be routed like on weekends in the LCR.

DTMF Settings

Minimum delay between two identical DTMF characters [s/100] received.

Tone Detector Settings

The GSM gateway can automatically detect user defined tones transmitted by GSM/UMTS for setting up outgoing calls to the GSM/UMTS networks. In general, they are tones of a transferred number. For the purpose of such detection, the GSM gateway automatically terminates the call and tries to set it up via another available outgoing group (if defined in the LCR).

- **Frequency 1;2;3;4** – define the frequencies for the tone to be detected.
- **Sequence list** – set the sequence of the tones to be detected.

Voice message detector settings

- **Minimum percent to match** – set the match percentage range in which the voice message is detected as identical with one of the voice messages recorded in the **Gateway control–>Voice messages** section under index 30 - 37. The recommended value is 70-90%.

Voice Parameters of GSM Modules

Set the voice level in the gateway GSM modules.

Tone Generated for Incoming calls from GSM/UMTS

- **Dial tone** – set the dial tone for incoming calls from GSM/UMTS.
- **Ring tone** – set the ring tone for incoming calls from GSM/UMTS.
- **Generate busy tone to GSM/UMTS** – enable busy tone generation for call termination.

> **Caution**
> - If the Generate busy tone function is enabled, the duration of outgoing calls billed by the GSM/UMTS provider will be extended!

Error GSM/UMTS Causes

Set the ISDN release cause for each of the below mentioned statuses. Every call that meets any of the below mentioned requirements, will be rejected with a user defined cause (the ISDN cause number will be translated to VoIP as a SIP code as defined below).

- **Lack of digits in OVERLAP mode** – any call that fails to meet the minimum digits count requirement will be rejected.
- **Restricted number prefix** – any call whose prefix is not included in any of the prefix lists will be rejected.
- **Selected module / GSM group is not ready** – a call will be rejected in case there is no available GSM module in the selected (by LCR) outgoing GSM group.
- **Selected module / GSM groups are not ready** – a call will be rejected in case there is no available GSM module in the selected (by LCR) outgoing GSM groups.

ISDN cause value	Description	SIP code	Description
1	Unallocated number	410	Gone
3	No route to destination	404	Not found
6	Channel unacceptable	503	Service unavailable
16	Normal call clearing	BYE	
17	User busy	486	Busy here
18	No user responding	480	Temporarily unavailable
19	No answer from user	480	Temporarily unavailable
21	Call rejected	603	Decline
22	Number changed	410	Gone
27	Destination out of order	404	Not found
28	Address incomplete	484	Address incomplete
29	Facility rejected	501	Not implemented
31	Normal, unspecified	BYE	
34	No circuit available	503	Service unavailable
38	Network out of order	503	Service unavailable
41	Temporary failure	503	Service unavailable
42	Switching equipment congestion	503	Service unavailable
44	Requested facility not subscribed	503	Service unavailable
47	Resource unavailable	503	Service unavailable
50	Requested facility not subscribed	503	Service unavailable
55	Incoming class barred within CVG	603	Decline
57	Bearer capability not authorised	501	Not implemented
58	Bearer cap, unavailable at present	501	Not implemented
63	Service or option unavailable	503	Service unavailable
65	Bearer cap, not implemented	501	Not implemented
79	Service or option not implemented	501	Not implemented
87	User not member of CVG	603	Decline
88	Incompatible destination	400	Wrong request
98	Invalid message	400	Wrong request
102	Recover on timer expiry	408	Request timeout
XXX	The other received CAU from netw.	500	Internal server error

Others

- **Text of SMS at no answer** – edit the text of the SMS to be sent to the calling party in case of no answer (if the function is active). The %N string will insert the CLIP received from VoIP in the SMS text.
- **Text of SMS for all calls** – complete this parameter to make the GSM gateway send SMS to every called party regardless of whether or not the call was successfully connected. The %N string will insert the CLIP received from VoIP in the SMS text.
- **Save received SMS to** – select the storage for received SMS messages.
- **SIM card identification** – set the SIM Id (IMSI/SCID) to be entered in the CDR.
- **Disable CLIP from GSM/UMTS to VoIP** – enable/disable resending of the CLIP from GSM to VoIP.
- **Reject call with CHLD** – enable rejection of incoming calls from GSM/UMTS via AT+CHLD (subscriber busy) instead of standard ATH.

GSM Group Assignment

Here you can assign the GSM/UMTS modules to groups. You can assign incoming and outgoing calls separately using the parameters below.

GSM Outgoing Groups

- **Mode of switching SIM card –** Define how the SIM cards should be used in the selected GSM group:
  - **SIM #** – the SIM cards in position # will only be used in the selected GSM group. In this case, the **Maximum called minutes** and **Disconnect call** parameters are disabled.
  - **By time** – the SIM card will be switched according to the Time of use parameter and call timer limitations.
  - **Random** – the SIM card will be switched randomly at defined time intervals and according to call timer limitations.
  - **By time and limit; then SIM card 1** – the SIM card will be switched according to the Time of use parameter and call timer limitations. When all SIM cards on a selected wireless engine are discharged, the system will switch the wireless engine back to the SIM card in position 1.
  - **Random and by limit; then SIM1**– the SIM card will be switched randomly at defined time intervals and according to call timer limitations. When all SIM cards on a selected wireless engine are discharged, system will switch the wireless engine back to the SIM card in position 1.
- **Last searched SIM (8 – all SIM will be searched) –** Define the number of SIM holder positions to be checked for SIM by the gateway after the GSM / UMTS board start/restart. The SIM card holders that were not tested have the (undef) status in the diagnostics window of the web interface.
- **Delay for CONNECT [s]** – define a delay before sending information on the connected call after receipt from GSM.
- **Minimum ring duration to send SMS at no answer [s]** – set the minimum ringing time for an outgoing call to GSM/UMTS before the SMS at no answer is sent.

Note

- The SMS at no answer function works properly only if the INVITE message contains the called and caller numbers.

- **Delay for ALERTING [a]** – define a delay before sending information on ringing start.
- **Minute parameter** – select whether or not the GSM gateway should record the call length or count for outgoing call restriction.
- **Day of deleting statistics in group (every month)** – define a day on which statistics on disconnected calls should be deleted.
- **SIM settings –** select which settings will be used for the SIM cards in positions 5 – 8:
  - SIM 5–8 is SIM 4 – all settings for the SIM cards in positions 5 – 8 will be the same as those for the SIM card in position 4.
  - SIM 5–8 is SIM 1–4 – all settings for the SIM card in position 5 will be the same as those for the SIM card in position 1. The SIM card in position 6 will use settings of the SIM card in position 2, SIM 3 = SIM 7 and SIM 4 = SIM 8.
- **Disable tone detection** – Deactivate the alerting tone detectors on the GSM / UMTS boards. Used for the GSM / UMTS networks that send call statuses through the signalling channel.
- **Generate virtual ring tone** – enable/disable generation of the virtual ringing tone to the VoIP interface.
- **Call length counting –** select whether the call should be counted in seconds or minutes.
- **BTS lock** – identify the BTS to which the GSM modules should be logged fixedly. Restart the selected GSM modules to execute the changes.
- **After call relax delay** – interval between the current call termination and next call setup via the same GSM/UMTS module. 2 seconds is recommended for high–traffic installations.

Disconnect Call

Set the rules for automatic disconnection of outgoing calls to a wireless network.

- **SIM limit exceeded** – automatic call disconnection when the active SIM card call limit is exceeded.
- **Time limit exceeded** – automatic call disconnection when the active SIM card time of use is exhausted.
- **No ALERTING before CONNECT** – automatic call disconnection when the gateway receives the call connect message without alerting.

Block SIM

Set the rules for SIM switching in the event of SIM limit exceeding.

- **Tariff 0(...4) minutes limit exceeded –** enable/disable SIM switching when the tariff 0(...4) minutes limit has been exhausted.
- **SMS limit exceeded –** enable/disable SIM switching when the SMS limit has been exhausted.
- **Minutes limit exceeded –** enable/disable SIM switching when the maximum

called minutes limit has been exhausted.
- **Daily minutes limit exceeded –** enable/disable SIM switching when the maximum daily minutes limit has been exhausted.

Send CLIP from VoIP/ISDN to GSM/UMTS

- **Transfer CLIP to GSM/UMTS** – enable/disable the function.
- **Separating char** – define the CDN/CLIP separating character.
- **Modify ('–' remove one digit)** – change the CLIP. The '–' character is used for deleting one character from the left.

Caution
- The Send CLIP from VoIP to GSM service must be supported by the GSM/UMTS provider's network. Otherwise, the call may be rejected by GSM/UMTS!

GPRS activation

- **APN string** – define the Access Point Name (APN) for GPRS connectivity.

Basic Settings

- **Roaming enabled for network code** – set the international network identifier for roaming purposes consisting of the following two codes:
  - **MCC** – Mobile Country Code – country code (Czech Republic – 230);
  - **MNC** – Mobile Network Code – GSM code (T–Mobile – 01, 0202, Vodafone – 03).

Hence, the international identification code for T–Mobile CZ is 23001. Leave this field empty to disable roaming.

Input	Note
<empty>	Roaming is restricted
2300	Roaming is restricted (minimum is five digits)
23002	Roaming is permitted for network with MCC+MNC code 23002
230XX	Roaming is permitted for network with MCC+MNC codes 23000 – 23099
XX001	Roaming is permitted for network with MCC+MNC codes 00001 – 99001
XXXXX	Roaming is permitted for any network

Note
- Before activating the roaming support, please check the SIM card for correct setting of the GSM / UMTS priority network list.

Caution
- Calls via roaming networks may cause additional call costs!

- **CLIR** – enable/disable presentation of the SIM CLIP on the called party's telephone. CLIR is recommended for the SIM card inserted in the GSM module to avoid CallBack problems.

> **Caution**
> - The **Temporary CLIP enable** and **Temporary CLIR enable** services must be supported by the GSM/UMTS provider's network. Otherwise, the call may be rejected by GSM/UMTS!

- **Maximum number of called minutes** – define the maximum count of minutes to be called within a month via the selected SIM card.
- **Count of SMS messages** – define the maximum count of SMS messages to be sent within a month via the selected SIM card.
- **Day of restoring call limit and delete statistics** – select a day in a month on which the Max count of called minutes and Count of SMS messages statistics shall be deleted.
- **First count** – set the length of the first pulse after which the pulse counting change starts as defined in the Next count parameter.
- **Next count** – set the length of one pulse in seconds after the time defined in the First count parameter elapses.

> **Note**
> - Set the two parameters above (**First count, Next count**) properly to count free minutes on SIM cards correctly. These parameters are used for limiting outgoing calls depending on free minutes. The CDRs contain real data.

- **Day limit of called minutes** – set the maximum count of minutes to be called within a day via the selected SIM card.
- **AOC sending interval –** set the interval to send AOC messages

Time Limits

There are two SIM use time limits in a GSM group.

Call tariffs – use this function to assign up to four independent free minute counters to a group of GSM modules (SIM cards), e.g.:

- **Tariff 1** = free minutes for calls to own GSM/UMTS network.
- **Tariff 2** = free minutes for calls to other GSM/UMTS networks.
- **Tariff 3** = free minutes for calls to fixed network.
- **Tariff 4** = free minutes for calls within a closed user group (VPN).

Complete the LCR table (assign prefixes to tariffs) properly to make full use of this function. If routing to a tariff is not used, the global free minutes function will be used in the LCR table.

- **Free minutes –** set the free minutes for the tariff offered by the provider.
- **Transferred minutes** – set the maximum count of free minutes to be transferred to the next period.
- **AOC sending interval –** set the interval to send AOC messages.
- **Day of restoring free minutes** – set a day on which the free minute counters

will be reset automatically. Select every 24 hours, a day in a month, or a day in a week.

- **Week of restoring free minutes in month** – set a week in which the free minute counters will be reset automatically. Set the week number only if the restoration takes place **every other Friday** in a month, e.g., or keep **Every** for the other cases.

Caution

- The recommended free minute counter value is X–5, where X is the number of free minutes obtained from the GSM/UMTS provider. Thus, you can avoid exceeding limits.
- The manufacturer is not responsible for additional call costs incurred as a result of exceeding your GSM/UMTS provider's free minute/SMS limit.

GSM Incoming Groups

2N® StarGate / BlueTower allows you to work with four groups of incoming calls. You can set different values for each of them.

General settings

- **Mode** – set how the gateway shall process incoming calls from the GSM network.
  - **Reject incoming calls** – all incoming calls from the GSM network are rejected automatically.
  - **Ignore incoming calls** – all incoming calls from the GSM network are ignored. The calling party hears the check ring tone.
  - **Accept incoming calls+ voice message** – incoming GSM calls are accepted by the gateway and, if programmed so, DTMF with a voice message is activated for them.
  - **Accept incoming calls + dialtone** – incoming GSM calls are accepted by the gateway and, if programmed so, DTMF with a simulated second dialtone is activated for them.
  - **CallBack after ring / Reject** – CallBack will be made if the CLIP is included in the CallBack table. The other incoming calls will be rejected.
  - **CallBack after ring / Ignore** – CallBack will be made if the CLIP is included in the CallBack table. The other incoming calls will be ignored.
  - **Report to PC + voice message** – the GSM gateway sends information on the incoming call to a PC equipped with call routing application. If programmed so, DTMF with a voice message is activated for the incoming call.
  - **Report to PC + dialtone** – the GSM gateway sends information on the incoming call to a PC equipped with call routing application. If programmed so, DTMF with a simulated second dialtone is activated for the incoming call.
- **Minimum digits in DTMF** – set the minimum count of digits to be requested by the gateway for DTMF.
- **Maximum digits in DTMF** – set the maximum count of digits to be accepted by the gateway for DTMF.
- **Timeout for entering DTMF digits [s]** – set the timeout for which the GSM gateway shall wait for the first/next DTMF digit. If you select '0', the incoming call will be automatically connected to the numbers included in the List of called numbers.
- **Day of deleting GSM group statistics** – set a day in a month on which the incoming call statistics shall be deleted.
- **Prefix before DISA** – set a numerical prefix to precede DTMF.
- **CLIP** – use this parameter to modify the incoming CLIP from GSM/UMTS. For international codes, '+' will be removed automatically. Use '–' to remove a digit. Examples (CLIP in GSM: +420600123456):

Parameter value	CLIP to VoIP/PRI 1	Note
Null	420261301500	No change in CLIP
+	+420261301500	Add + before CLIP beginning
00	00420261301500	Add 00 before CLIP beginning
––	0261301500	Remove two first digits from CLIP beginning
–––99	99261301500	Remove first three digits and add 99 before CLIP beginning

- **Looping of voice message** – set the voice message playing time.

Send CLIP from GSM/UMTS to VoIP/ISDN

- **Transfer CLIP from GSM/UMTS** – enable/disable the function.
- **Separating char** – set the separator for the SIM card CLIP and ID of the extension to be called.
- **Modify** – modify the extension ID.

Caution

- The **Send CLIP from VoIP to GSM** service must be supported by the GSM/UMTS provider's network. Otherwise, the call may be rejected by GSM/UMTS.

Others

- **Time to keep CLIP in table** – set the record keeping time for AutoCLIP routing.
- **Add record only for unconnected call** – enable storing of unconnected outgoing calls in the AutoCLIP table only.
- **Delete record for connected answer** – enable deletion of an AutoCLIP record in the case of successful CallBack.
- **Skip DTMF for numbers not in CLIP Routing table** – enable this option to set DTMF to the incoming calls only whose CLIP is included in the CLIP Routing table.
- **Skip list of called numbers after failed call to wanted number** – enable this function to disable forwarding of incoming calls to the numbers included in the List of called numbers if rejected after DTMF.
- **Auto end to CallBack request** – enable that the incoming call whose CLIP meets the CallBack settings will be rejected. If not, the call will be ignored. The CallBack function will be retrieved after call end in both the cases.

List of Called Numbers

List of numbers to be dialled if DTMF dial–in was not made. Search the table from top to bottom. If the called user is inaccessible, use the following table record.

Prefixes

Use this window to adapt the gateway to calling to various GSM providers' networks. Set the call routing rules based on prefixes for up to eight groups.

Prefix List 1–8

Eight prefix groups to be assigned in the LCR table.

Basic Settings

- **GSM network ID** – set the prefix list user code for easier orientation in the LCR.
- **Default count of digits** – default length of the number to be dialled into the GSM/UMTS networks for routing via the selected prefix list. Use this parameter in case the Digits count is not included in the Accepted prefixes table.

Table of Replaced Prefixes

Use this table to replace the prefix of the received number ('00' with '+', e.g.). You can only add or remove the prefix. This change is made before the prefix is searched for in the prefix table. Be sure to keep the „/" record in the table for a proper function.

Table of Accepted Prefixes

List of prefixes of called destinations to which the selected prefix list applies.

Note

- The maximum count of Table of Accepted Prefixes records is 128.

Prefix Change for PRI 1 to PRI 2 Calls

A table of prefixes to be replaced in the case of PRI 1 to PRI 2 outgoing calls.

LCR Table

Table of outgoing Least Cost Routing (LCR) rules. Every outgoing call from the PRI 1/VoIP interface is routed to GSM / UMTS according to this table. For a call, the gateway checks the lines and if the called number prefix matches the prefix in the selected network list and the current time value is within time limitation limits, the call will be routed via the defined GSM group(s) or PRI 2 interface.

- **Prefix list** – prefixes to be used for a selected LCR row.
- **Time limitation** – time validity limitation for a selected LCR row.
- **Weekend usage** – enable/disable a row on weekends.
- **Call duration lim** – set the maximum duration (minutes) for an outgoing call to the GSM/UMTS network.
- **Groups** – outgoing GSM groups used for the selected LCR row.

- Fallback port (9): set the fallback port. If the fallback port service is unavailable, the next LCR table row is applied. Select the appropriate routing rule to set the fallback port in the **Gateway configuration–>Port modes**.

- **Tariffs** – select the tariff group (free minute counter) to be used for the outgoing call. Refer to the GSM outgoing groups subsection for details.
- **Ignore tone detection in last group** – having detected a user defined tone (refer to GSM basic settings), the GSM gateway automatically terminates the call and seeks for another call setup way. If this parameter is activated, the GSM gateway ignores the tone detection results and sets up a call when this is the only possible call establishing way.

Note

- If you use tariff routing, set the tariffs properly in the GSM outgoing groups subsection
- The maximum count of LCR table records is 64.

CLIP Routing Table + CallBack

Use the table to set a fixed CLIP assignment of incoming CLIPs from GSM to the numbers of extensions to which incoming calls are routed automatically. Also, set the CLIP list in the GSM network for which CallBack is enabled.

- **GSM number (CLIP)** – user Id in GSM/UMTS.
- **Used Service**
  - **Autodial** – enable/disable CLIP routing for the selected CLIP.
  - **Reject call –** reject call for the selected CLIP**.**
  - **Ignore call** – ignore call for the selected CLIP
  - **Tone dial–in –** incoming GSM calls is accepted + dialtone is activated for the selected CLIP
  - **Disa message dial–in –** incoming GSM calls is accepted + voice message is activated for the selected CLIP
- **Dial to VoIP** – VoIP destination number for the CLIP routing function.
- **Auto CallBack** – enable/disable CallBack routing for the selected CLIP.
- **Call duration limit** – set the maximum call duration (minutes).

Note

- Remember to activate the CallBack mode in the **GSM incoming groups** for a proper function.
- The maximum count of CLIP routing table records is 96.

Ethernet Configuration

This window helps you configure the Ethernet interface of your gateway.

- **Use DHCP** – enable/disable the DHCP client function in **2N® StarGate / BlueTower**.
- **IP address** – the fixed IP address (v4) of the **2N® StarGate / BlueTower** Ethernet interface.
- **Subnet mask** – the subnet mask for the **2N® StarGate / BlueTower** Ethernet

interface.

- **Default gateway** – The IP gateway IP address (v4) in the Ethernet network.
- **DNS server1** – primary DNS server.
- **DNS server2** – secondary DNS server. Used as a back-up when DNS server 1 is not functional.

Caution

- Incorrect settings, e.g. enabling the **DHCP client service**, may result in a denial of access to the **2N® StarGate / BlueTower** configuration. To avoid this, restore the GSM gateway default settings. Refer to Subs. Basic CPU Board for details Jumper pro default.

Tip

- In case the gateway is in the DHCP client mode, current assignments obtained from the DHCP server are displayed in the **IP address, Subnet mask** and Default gateway items.

Login Configuration

The window helps you set the access password and name for the **2N® StarGate / BlueTower** web interface. Use the same data for Telnet connection too.

Caution

- Remember to change the username and password during the first gateway configuration to avoid unauthorised access!

Web Configuration

Set additional parameters for the gateway web interface.

- **Auto logout** – set the count of minutes in which the current user should be logged out automatically.
- **Enable web session lock** – by default, one Admin user may only be connected to the GSM gateway at a moment. If another authorised user tries to log in, the previous session will be aborted automatically. By activating this function you disable such automatic logout and block any further access attempts.
- **Simple login form** – here you can change the login window graphic lay–out. Upon activation, the GSM gateway login page will have an anonymous appearance. This function is recommended for connecting the gateway to the Internet directly.
- **Use SMS user for SMS operations on the web** – enable/disable the user authorised for SMS sending/receiving only.
- **SMS user name/password** – the gateway enables independent connection of a user authorised for SMS receiving/sending only.

Report Configuration

This window is used for setting details on automatic tracing generated by the GSM gateway.

Messaging

This group helps:

- Set the GSM gateway to send/receive SMS via SMTP/POP3 or SMPP
- Define the routing rules for incoming and outgoing SMS messages
- Check the GSM gateway SMS database filling capacity

> **Caution**
> - This service is file-licensed. Refer to **Management–>Licence key** for the current GSM gateway licence details.

Modules Grouping

Global settings

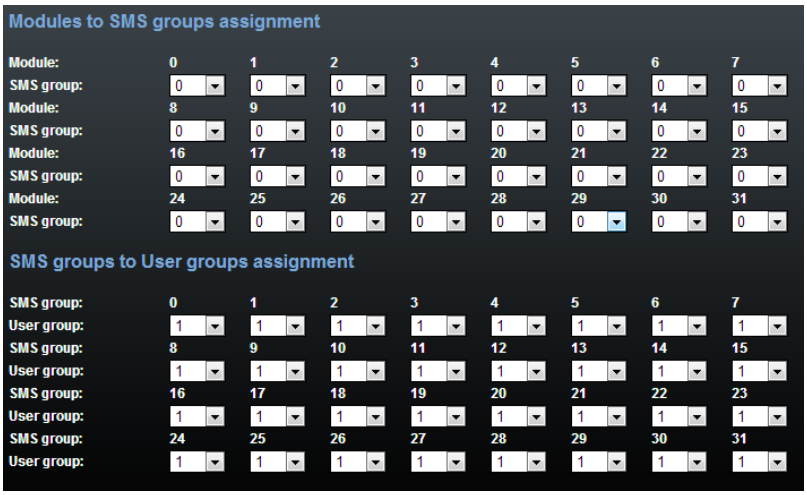
- **SMS server enabled –** enable/disable the SMS server at the GSM gateway (keep disabled if you select another SMS processing method).
- **AutoCLIP routing expires [hours] (1-10000, 0=off) –** set the maximum time for keeping of the automatic SMS routing record (response) in the AutoCLIP table.

Modules to SMS groups assignment

This section helps you assign GSM modules to SMS groups (according to the GSM provider, e.g.) to facilitate incoming/outgoing SMS routing.

SMS groups to User groups assignment

This section helps you assign SMS groups to User groups for SMS sending/receiving purposes. The GSM gateway can contain up to four User groups.


Modules to SMS groups assignment
Module: 0 1 2 3 4 5 6 7
SMS group: 0 0 0 0 0 0 0 0
Module: 8 9 10 11 12 13 14 15
SMS group: 0 0 0 0 0 0 0 0
Module: 16 17 18 19 20 21 22 23
SMS group: 0 0 0 0 0 0 0 0
Module: 24 25 26 27 28 29 30 31
SMS group: 0 0 0 0 0 0 0 0
SMS groups to User groups assignment
SMS group: 0 1 2 3 4 5 6 7
User group: 1 1 1 1 1 1 1 1
SMS group: 8 9 10 11 12 13 14 15
User group: 1 1 1 1 1 1 1 1
SMS group: 16 17 18 19 20 21 22 23
User group: 1 1 1 1 1 1 1 1
SMS group: 24 25 26 27 28 29 30 31
User group: 1 1 1 1 1 1 1 1

Caution

- The count of user accounts is file-licensed. Refer to **Management–>Licence key** for the current GSM gateway licence details.

Users

This section helps you manage the SMS users. Select a communication protocol for user adding (SMTP/POP3 or SMPP).

Add user

- **User group –**assign the user to a User group.
- **User full name –** define the system user name.
- **Replace dial for outgoing SMS –** define the number (CPN) to which the user's outgoing SMS messages shall be sent.
- **Access type –** select the communication protocol for SMS processing:
  Login name (without domain) – define the login name for the client Email.
  - **Email (SMTP/POP3)** – use SMTP for SMS sending and POP3 for SMS receiving.
  - **SMPP (SMSC)** – set the GSM gateway into the 'SMS centre' mode.
  - **SMPP (ESME)** – set the GSM gateway into the 'ESME - External Short Messaging Entity' mode.
- **System ID –** SMSC user ID.
- **Password** – SMSC/SMTP user password.
- **System ID (for authentication on remote side)** – ESME user ID.
- **Password (for authentication on remote side)** – ESME user ID.
- **TCP type –** set the TCP parameter into the client/server mode.
- **Server address** – set the server IP address and TCP server transport port.
- **Message direction of Esme –** set the ESME user details:
  - **Transceiver** – ESME works as a transmitter/receiver.
  - **Transmitter –** ESME works as a transmitter.
  - **Receiver –** ESME works as a receiver.
- **Address range –** set this parameter if required so by SMSC for SMS receiving.
- **Delivery status required** – set the SMS sending request for outgoing SMS delivery confirmation.
- **Send message as Flash SMS** – activate the Flash SMS function for outgoing SMS messages.

Note

- You can set the **Delivery status required** parameter only if the SMTP/POP3 protocol is used.
- With SMPP, the delivery information is active automatically in case the service is required by the SMPP counterparty or via an incoming SMS message from the GSM/UMTS network.

User Group

This section helps you edit the User group and set the routing rules for the group's incoming and outgoing SMS.

General settings

Set the basic parameters for SMS sending via SMTP/POP3 or SMPP.

Optional information

- **Description –** set the User group details.
- **Identical SMS limit** – set the check of identical SMS messages, i.e. sequentially sent messages with identical SMS PDUs. When the set limit is exceeded, the excessive SMS messages are discarded without being sent.

Email settings

- **Domain –** define the domain name for SMS sending/receiving via SMTP/POP3.
- **POP3 - Subject of email –** set the message subject to be added automatically to the SMS loaded from the GSM gateway via POP3.
- **POP3 - Subject of email (delivery acknowledgement)** – set the SMS delivery acknowledging message subject**.**
- **POP3 - Subject of email (not delivered)** – set the SMS non-delivery acknowledging message subject.
- **POP3 - Subject of email (send error)** – set the SMS sending failure message subject.
- **SMTP - Maximum SMS per email –** set the maximum count of SMS messages to be sent within one Email message. Any characters exceeding the set length will be ignored.
- **SMTP - Add "From" to SMS –** add 'From' from the Email message to the outgoing SMS. The sender information will be displayed at the beginning of the SMS message.
- **SMTP - Add "Subject" to SMS –** add 'Subject' from the Email message to the outgoing SMS. The subject information will be displayed at the beginning of the SMS message.

SMPP address modification

- **Source address of message incoming from SMPP** – set how to modify the message sender ID received via SMPP.
    - **Never replace original address**
    - **Replace if the original address is empty**
    - **Always replace original address**
  - **address** – enter sender's new ID
  - **TON** – type of number
  - **NPI** – numbering plan indicator
- **Destination address of message incoming from SMPP** – set how to modify the message addressee telephone number received via SMPP.
    - **Never replace original address**
    - **Replace if the original address is empty**
    - **Always replace original address**
  - **address** – enter addressee's new telephone number
  - **TON** – type of number
  - **NPI** – numbering plan indicator
- **Source address of message outgoing to SMPP** – set how to modify the message sender ID to be sent via SMPP.
    - **Never replace original address**
    - **Replace if the original address is empty**
    - **Always replace original address**
  - **address** – enter sender's new ID
  - **TON** – type of number
  - **NPI** – numbering plan indicator
- **Destination address of message outgoing to SMPP** – set how to modify the message addressee telephone number to be sent via SMPP.
    - **Never replace original address**
    - **Replace if the original address is empty**
    - **Always replace original address**
  - **address** – enter addressee's new telephone number
  - **TON** – type of number
  - **NPI** – numbering plan indicator

Incoming SMS routing

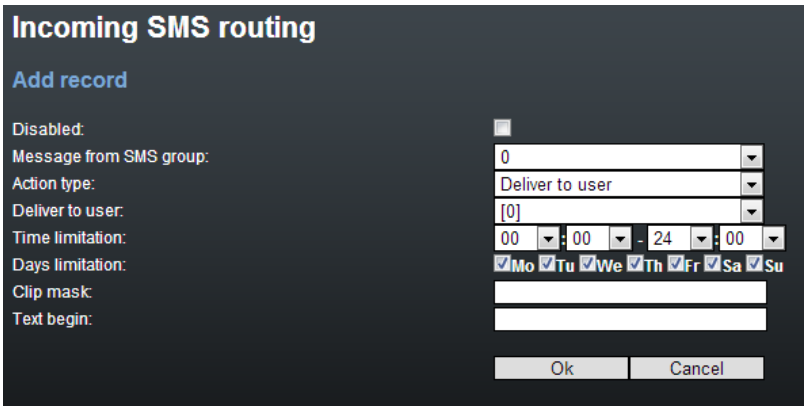
This section helps you set the incoming SMS routing rules, which are included in the incoming SMS routing table.

Add record

- **Disabled –** enable/disable the selected routing rule.
- **Message from SMS group –** select the SMS group that receives the SMS.
- **Action type –** select the action for the received SMS:
  - **Autoclip routing** – the incoming SMS will be routed according to the AutoCLIP table records.
  - **Deliver to user** – the SMS will be delivered to the selected user.
  - **Drop message** – the SMS will be dropped.
- **Deliver to user –** select the SMS addressee. This option is valid only if **Action type = Deliver to user** is selected.
- **Time limitation –** set the rule validity time.
- **Days limitation –** set the days in a week on which the rule shall be valid.
- **Clip mask –** set the filter for the SMS sender telephone number (CLIP). If the selected mask matches the CLIP, the SMS will be routed according to the rules set above. If not, the SMS will be dropped. The ***** character replaces any string of characters (789789789=789*, e.g.). The **?** character replaces any character (789789789=789??????, e.g.).
- **Text begin –** set the string to be matched against the SMS text beginning. If a match is found, the SMS will be routed according to the rules set above.

Note

- The rules are applied to incoming SMS sequentially, starting from the first rule. If all the set rules are met in a row, the SMS is routed according to the row.



Outgoing SMS routing

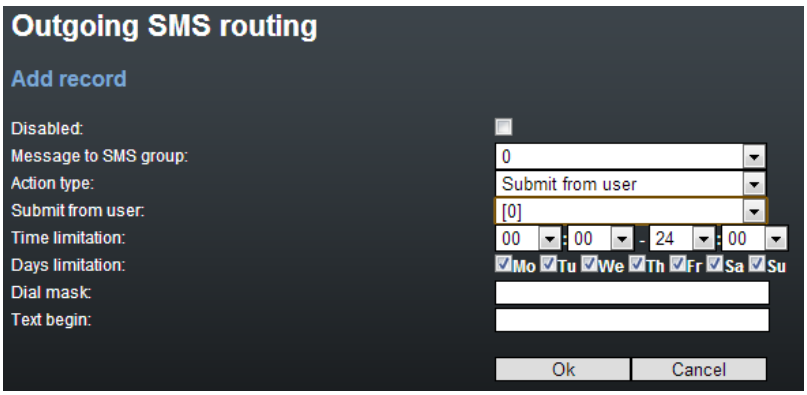
This section helps you define the outgoing SMS routing rules, which are included in the outgoing SMS routing table.

Add record

- **Disabled –** enable/disable the selected routing rule.
- **Message to SMS group –** select the SMS group via which the SMS will be sent.
- **Action type –** select the action for the outgoing SMS:
  - **Submit from user** – enable sending SMS from the selected user.
  - **Submit from all users** – enable sending SMS from all the SMS group users.
- **Submit from user –** select the user in case **Action type = Submit from user** is selected.
- **Time limitation –** set the rule validity time.
- **Days limitation –** set the days in a week on which the rule shall be valid.
- **Dial mask –** set the filter for the SMS addressee telephone number (Dial). If the selected mask matches the Dial, the SMS will be routed according to the rules set above. If not, the SMS will be rejected and deleted. The * character replaces any string of characters (789789789 = 789*, e.g.). The ? character replaces any character (789789789 = 789??????, e.g.).
- **Text begin –** set the string to be matched against the SMS text beginning. If a match is found, the SMS will be routed according to the rules set above.

Note

- The rules are applied to outgoing SMS sequentially, starting from the first rule. If all the set rules are met in a row, the SMS is routed according to the row.



Control

This section helps you monitor the system. It includes storage filling information and AutoCLIP records.

SMS queues

The subsection displays the current SMS storage state.

Incoming SMS database

The subsection displays current information on the incoming SMS storage filling percentage and maximum count of incoming storage records.

Caution

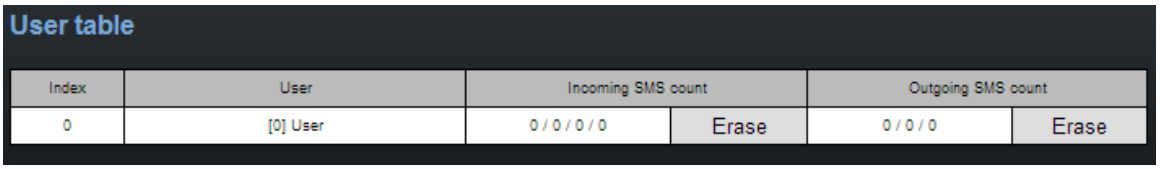
- The POP3 protocol enables you to set how long a copy of the loaded message shall be kept in the SMS server. The SMS keeping time depends on your e–mail client setting. Make sure that you have chosen a correct time value to avoid database overfilling. When the storage has been filled up, no new SMS messages will be received!

Outgoing SMS database

The subsection displays current information on the outgoing SMS storage filling percentage and maximum count of outgoing storage records.

User table

The table shows the count of incoming and outgoing SMS stored in the above-mentioned databases from the user's point of view and helps you delete the SMS stored.



User table items:

- **Incoming SMS count** – Received / Ack OK / Ack error / Failed
  - **Received** – count of received common SMS messages
  - **Ack OK** – count of SMS delivery acknowledging messages
  - **Ack error** – count of SMS non-delivery acknowledging messages
  - **Failed** – count of SMS sending failure messages (failed due to network error, invalid number, etc.)
- **Outgoing SMS count** – Waiting / Sending /Sent
  - **Waiting** – count of waiting SMS messages
  - **Sending** – count of currently sent SMS messages
  - **Sent** – count of sent SMS messages waiting for delivery acknowledgement

AutoCLIP routing table

The window displays the current state of the AutoCLIP table.

SMTP/POP3 Basic Configuration – Step by Step

This section helps you define the **2N® StarGate/BlueTower** basic parameters for SMS sending/receiving via SMTP/POP3. Read the Messaging subsection carefully before setting details.

Figure 1 shows sending/receving SMS via SMTP/POP3. Having created user accounts in **2N® StarGate**, the users can access the accounts via the e-mail client and send SMS messages to **2N® StarGate** via SMTP. The gateway receives the messages and resends them to the GSM users according to the predefined routing rules.

A message coming to **2N® StarGate** from GSM is routed according to the incoming SMS rules and delivered to the user via POP3.

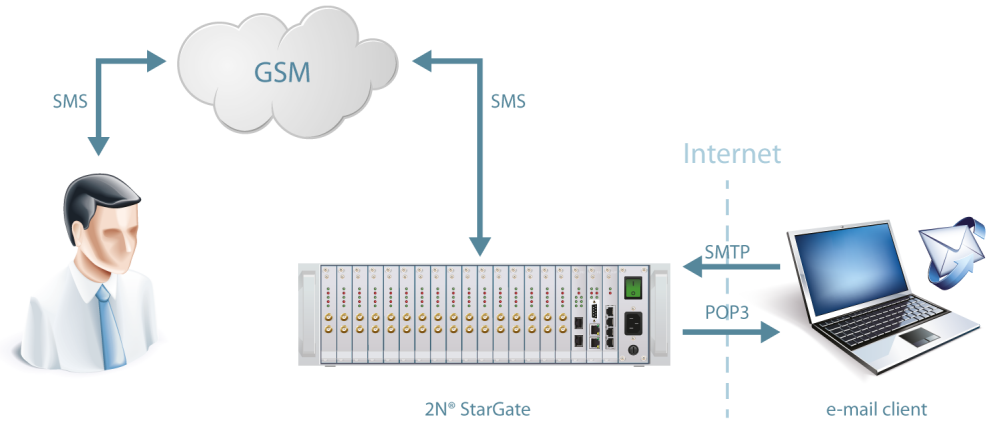


Figure 1: SMTP/POP3 Communication

Note

- You can send an SMS message of any length to up to 100 users at the same time from the e-mail client. The maximum SMS count per e-mail is only limited by the **User group–>General settings SMTP–>Maximum SMS per email** settings.

Take the following basic steps in **2N® StarGate** to enable SMS sending/receiving:

1. In the **Monitoring–>SMS grouping** menu:
    a. Assign the selected GSM modules to the SMS groups (according to the GSM provider and SIM cards with identical tariffs, for example).
    b. Assign the SMS groups created in step 1.a above to the User groups if you use messaging with different routing rules to different company departments, for example.
2. Add users in the **Monitoring–>Users–>Add** menu:
    a. Assign the user to a **User group**.
    b. Set **Access type: Email(SMTP/POP3)**.
    c. Define the **Login name (without domain)** and **Password** to log in to the

SMS server via your e–mail client.

3. Set the Domain in the **Messaging–>User Group–>General settings–>Email settings–>Domain** menu.

    a. Set the user domain. The domain is automatically assigned to the user name in the selected User group and represents the user e–mail address. Example: Suppose a user was created in step 2.c with **Login name: USER** and domain **Domain: email.com**, then the e-mail address of the user with the right to access the SMS server will be **USER@email.com.** The @ character is completed automatically and is not included in the Domain: field.

4. Create the incoming SMS routing rules in the **Messaging–>User Group–>General settings–>Incoming SMS routing–>Add** menu:

    a. Select the group to receive the SMS via the **Message from SMS group.**
    b. Select the **Action type** to define how to process incoming SMS. Example: Set **Action type: Deliver** to user to deliver SMS to selected users.
    c. Set **Deliver to user** to define the SMS receiving user.

5. Create the outgoing SMS routing rules in the **Messaging–>User Group–>General settings–>Outgoing SMS routing–>Add** menu:
   Enable the SMS server in the Messaging–>Modules grouping–>SMS server enabled menu.

    a. Set the **SMS group** via which the outgoing SMS will be routed in the **Message to SMS group** menu.
    b. Select the **Action type** to define how to process outgoing SMS. Example: Set **Action type:** Submit from user to send SMS from selected users.
    c. Set **Submit from user** to define the SMS sending user.

Should you get in troubles, follow the steps below please:

- Read the User Manual carefully and check all parameters.
- Find answers to the frequently asked questions at http://faq.2n.cz.
- Consult your servicing partner.

You are recommended to attend a 2N certified training to improve your installation chances.

SMPP Basic Configuration – Step by Step

This section helps you define the basic parameters for SMS sending/receiving via SMPP in **2N® StarGate**. Read the Messaging subsection carefully before setting details.

Figure 1 shows sending/receiving SMS via SMPP. Having created user accounts in **2N® StarGate**, the users can send/receive SMS via SMPP. The figure shows an example with two SMSC accounts created in **2N® StarGate** (to the right). Another **2N® StarGate** (ESME) gateway and a PC on which the SMPP (ESME) application is running are connected to these accounts via SMPP. An SMS coming to **2N® StarGate** via SMPP is routed according to the gateway outgoing routing rules and sent to GSM. An SMS coming from GSM is routed according to the gateway incoming routing rules and sent to the destination via SMPP.

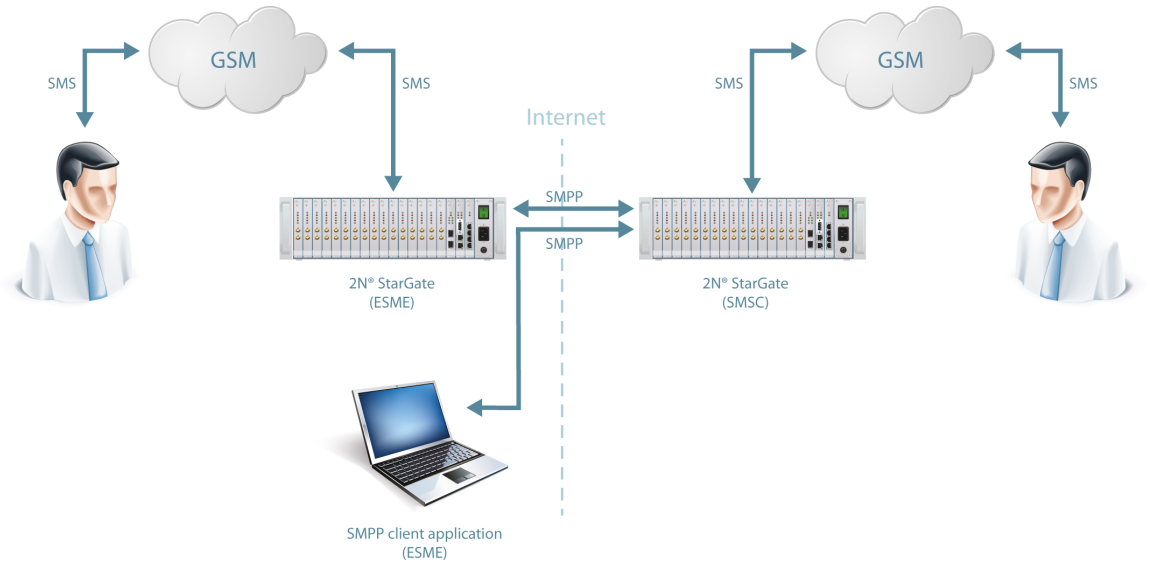


Figure 1: SMPP Communication

Take the following basic steps in **2N® StarGate** to enable SMS sending/receiving:

1. In the **Monitoring–>SMS grouping** menu:
    a. Assign the selected GSM modules to the SMS groups (according to the GSM provider and SIM cards with identical tariffs, for example).
    b. Assign the SMS groups created in step 1.a above to the User groups if you use messaging with different routing rules to different company departments, for example.
2. Add users in the **Monitoring–>Users–>Add** menu:
    a. Assign the user to a **User group.**
    b. Set **Access type: SMPP (SMSC).**
    c. Set **System ID** and **Password** to access the GSM gateway SMS server via ESME.
    d. Set **TCP type: server**.
3. Create the incoming SMS routing rules in the **Messaging–>User**

Group–>General settings–>Incoming SMS routing–>Add menu:

a. Select the group to receive the SMS via the **Message from SMS group** menu.
b. Select the **Action type** to define how to process incoming SMS. Example: Set **Action type: Deliver to user to deliver SMS to selected users.**
c. Set **Deliver to user** to to define the SMS receiving user.

4. Create the outgoing SMS routing rules in the **Messaging–>User Group–>General settings–>Outgoing SMS routing–>Add** menu:
   Enable the SMS server in the **Messaging–>Modules grouping–>SMS server enabled menu.**

   a. Set the **SMS group** via which the outgoing SMS will be routed in the **Message to SMS group** menu.
   b. Select the **Action type** to define how to process outgoing SMS. Example: Set **Action type: Submit from user** to send SMS from selected users.
   c. Set **Submit from user** to define the SMS sending user.

Should you get in troubles, follow the steps below please:

- Read the User Manual carefully and check all parameters.
- Find answers to the frequently asked questions at http://faq.2n.cz.
- Consult your servicing partner.

You are recommended to attend a 2N certified training to improve your installation chances.

Monitoring

This section helps you configure sending of SNMP traps. Download the list of available traps, i.e. the MIB table, from the gateway web interface. The main purpose of SNMP monitoring is to observe your GSM gateway states continuously and send state information to the defined IP addresses whenever an error occurs. The SNMP agent on the CPU monitors the following states (some can be disabled by the user) .

- GSM gateway accessibility
- GSM/UMTS, PRI and VoIP card presence/absence
- Count of active calls via PRI ISDN and VoIP
- Received signal level for each GSM/UMTS module
- ISDN line and GSM/UMTS module error states

Refer to the **List of SNMP traps** for the list of all SNMP traps sent by **2N® StarGate**.

Caution

- This service is subject to licence! Refer to **Management–>Licence key** for the current GSM gateway licence state details.

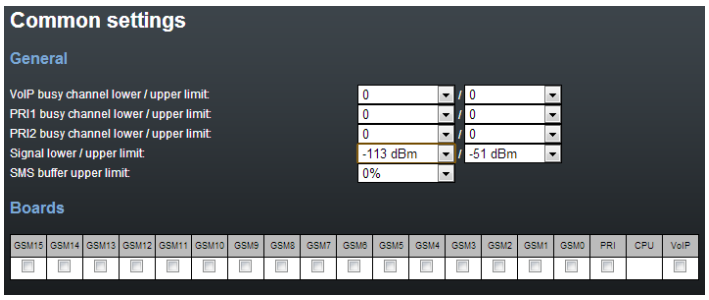
Common Settings

General

- **Number of used channels –** define the maximum/minimum count of active voice channels (VoIP, PRI ISDN). The SNMP trap is sent automatically whenever the defined values are exceeded.
- **Signal level –** define the maximum/minimum level of the signal received by the GSM/UMTS module. The SNMP trap is sent automatically whenever the defined values are exceeded.
- **SMS bufer upper limit** – define the maximum filling capacity of the SMS storage. The SNMP trap is sent automatically whenever the defined value is exceeded.

Boards

Enable/disable the card positions to be monitored. The CPU card is always monitored and monitoring cannot be disabled.


Common settings
General
VoIP busy channel lower / upper limit:
PRI1 busy channel lower / upper limit:
PRI2 busy channel lower / upper limit:
Signal lower / upper limit:
SMS buffer upper limit:
-113 dBm
-51 dBm
0%
Boards
GSM15 GSM14 GSM13 GSM12 GSM11 GSM10 GSM9 GSM8 GSM7 GSM6 GSM5 GSM4 GSM3 GSM2 GSM1 GSM0 PRI CPU VoIP

SNMP

General

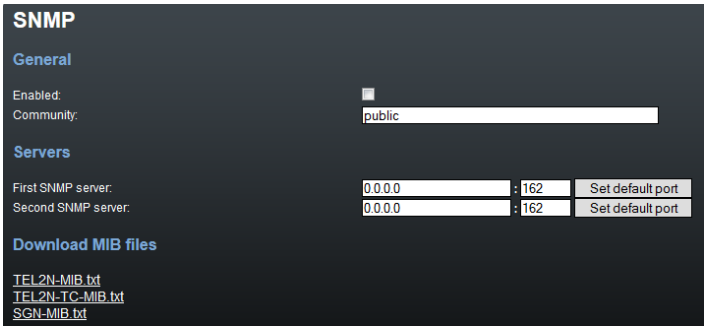
- **Enabled** – enable/disable the SNMP service.
- **Community** – SNMP community is a group that owns the device and control stations on which SNMP is running. Default value = public.

Servers

- **First SNMP server** – the addressee's primary IP address and transport port for SNMP traps (default port = 162). Please make sure that the parameters have been completed correctly to avoid SNMP malfunction.
- **Second SNMP server** – the addressee's secondary IP address and transport port for SNMP traps (default port = 162). If these parameters are correctly completed, the SNMP traps will be sent both to the primary and secondary IP addresses.

Download MIB files

This section helps you download the MIB files that are necessary for a proper function of your MIB browser.



Caution

The SNMP service works properly on condition that

- SNMP is licensed in the **Management** section.
- The primary IP address, transport port and community parameters are completed.
- SNMP is enabled in the **Monitoring** section.

Others

SIM Client

This section is displayed for those GSM gateways only that support the **2N® SIM Star** system connection – remote SIM card function.

SMS

This subsection helps you send and receive SMS via the modules.

Tip

- You can also use the SMS user account for SMS sending/receiving. Refer to the Web Configuration subsection for SMS user configuration details.

Utils

This section provides extra functions of the GSM gateway. At present, the GSM gateway offers the Ethernet interface tracing (Network trace) and gateway communication tracing functions. These functions help detect gateway installation troubles (SIP communication debugging). The file format is PCAP, which is readable in the Wireshark (http://www.wireshark.org/) program, for example.

Management

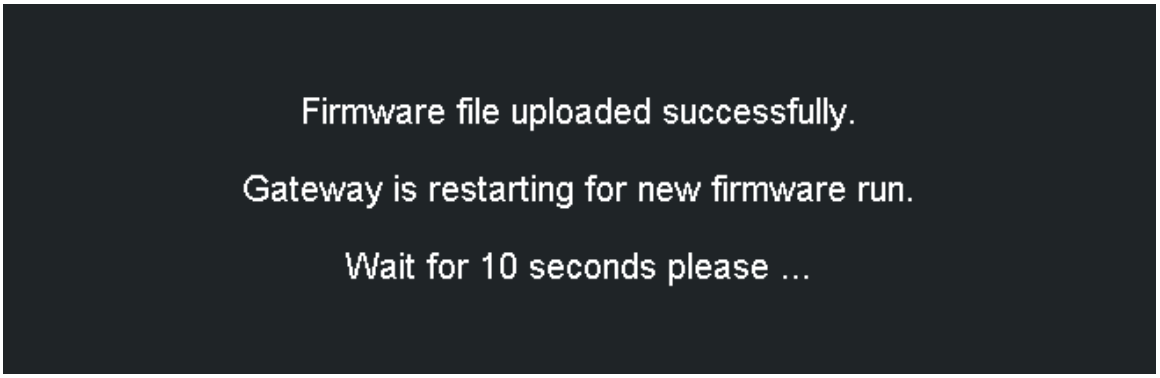
Update

This section helps you upgrade your GSM gateway firmware. Select the SGN–x.x.x.x.x.bin files only. Refer to the Web Configuration Interface - Others - Update subsection for more details.

Warning

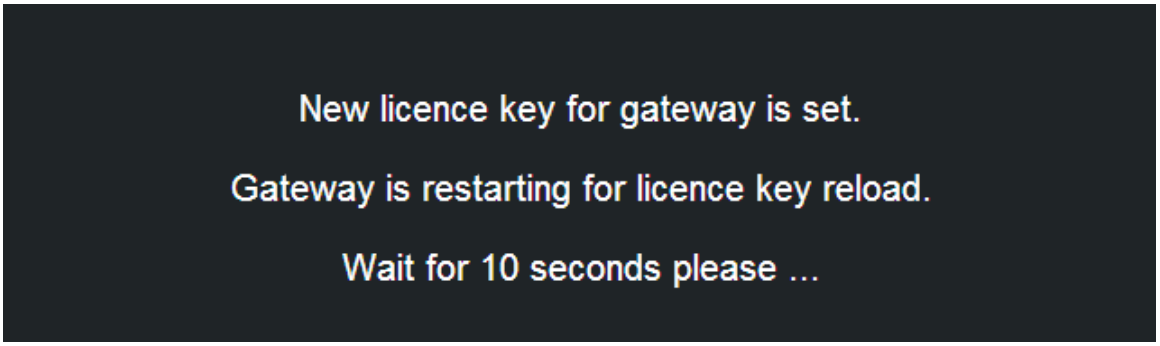
- Use the firmware certified for this GSM gateway type only to avoid irreversible damage to your system!

When the new firmware file has been uploaded successfully, the GSM gateway will be restarted automatically.



Licence key

This section helps you download the licence file/code to **2N® StarGate** and provides information on the current licence file. Refer to Gateway Control for more details.

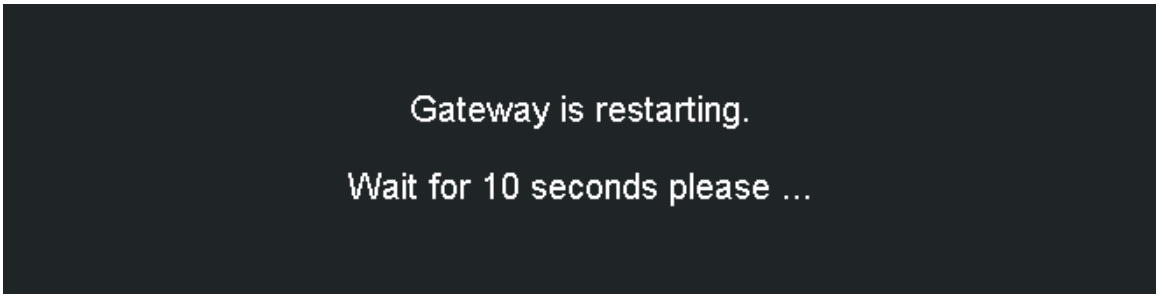


Caution

- By inserting a new licence code you restart the GSM gateway and discontinue all the currently made calls!

Restart

This subsection provides information on a forced restart of **2N® StarGate / BlueTower**.



Configuration download

The window helps you download the current **2N® StarGate / BlueTower** configuratio n. The file format is CFG–M202–gateway_serial_number–rrrrmmdd–hhmmss.tar.

Configuration upload

The window helps you upload new configuration settings into **2N® StarGate / BlueTower**. The Ethernet interface and login data remain the same!

Warning

- Be sure to upload the configuration file intended for the selected GSM gateway only to avoid malfunction of the GSM gateway and the necessity to restart the system.

Configuration reset

This subsection helps you restore the default configuration (except for Ethernet and login).

- **Including LCR table** – enable/disable keeping of the LCR table records .
- **Including CLIP routing table** – enable/disable keeping of the CLIP routing table records.

Documentation

Download the User Manual saved in the gateway.

Caution

- The User Manual version will not change during the gateway firmware upgrade. Click on the link to www.2n.cz for the latest User Manual version!

3.4 Enhanced CPU Configuration

The enhanced version of the CPU board (eCPU) is located on the CPU card. For the complete hardware description see the Enhanced CPU Board subsection. The enhanced CPU board supports all basic CPU features plus several new features:

- A comfortable graphic web interface for easy remote control.
- Support of the **2N® SIM Star** system.
- Support of the SMTP and POP3 protocols for sending/receiving SMS.
- CDR downloader (an SD card is required).
- SMS and Call simulator.
- SNMP alerts.

Caution

- Some features can be limited by the licence file. For detailed information on the current licence state see the 2.4 Installation subsection.

Serial Console Access

The console system is arranged as a set of nested menus. By selecting a menu item you either get into a submenu, or have the required operation executed, or set the selected parameter.

Serial Connection Settings

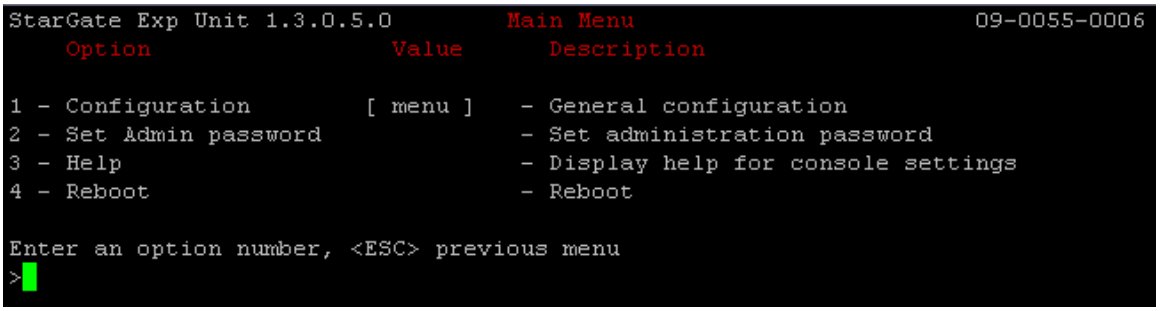
Default parameters of the eCPU serial connection:

Item	Value
Baud rate	115,200bps
Bits	8
Parity	None
Stop-bits	1
Flow control	None

For communication using the RS232 serial connection set the JP1 jumper on the CPU board correctly. For details refer to the Basic CPU Board - Configuration Jumpers subsection.

Serial Console

When the gateway is powered on, the main menu should get displayed after terminal connection. To enter the main menu, press **ENTER**.


StarGate Exp Unit 1.3.0.5.0 Main Menu 09-0055-0006
Option Value Description
1 - Configuration [menu] - General configuration
2 - Set Admin password - Set administration password
3 - Help - Display help for console settings
4 - Reboot - Reboot
Enter an option number, <ESC> previous menu
>

If you select a submenu, this submenu gets displayed. Now you can select items from the selected submenu or push the ESC button for return.

Below is a brief survey of these menus only.

- **Main menu**
  This menu appears after the serial cable is connected to the eCPU (sometimes you must press Enter). The main menu contains the following items:
- **Configuration menu**
  Use this menu to configure the Ethernet interface and serial console:
  - **Network** – contains eCPU Ethernet interface settings. Set the static IP address or activate the DHCP service support. You are recommended to reboot the eCPU after changing any of the IP settings.
  - **Console** – basic settings of the serial link.
  - **Reset settings** – here restore the factory settings of the eCPU.
- **Set Admin password** – here you can change the Admin password locally.
- **Reboot** – here you can reboot the eCPU (e.g. in the case of IP setting changes).

After making correct IP settings, you can connect the eCPU to your Ethernet network and perform complete configuration via a user-friendly web interface.

Web Browser Access

While the serial console interface enables you to change the basic gateway parameters only, the web browser gives you access to all parameter settings and services available in the gateway. To establish connection with the gateway, enter the gateway IP address into the Internet address setting line in the browser.

If you have connected all parts properly and set the correct gateway and PC IP addresses, the request to enter the access user name and password should get displayed.

Tip

- eCPU also supports access via secured http protocol: **https://IP_add**.

Caution

- The manufacturer supplies the gateways with a predefined default user account **Admin** without having set its default password. Mind the Upper/Lower Case while entering the user name and password! The first thing you should do for safety reasons after putting your gateway in operation is to change the administrator password.

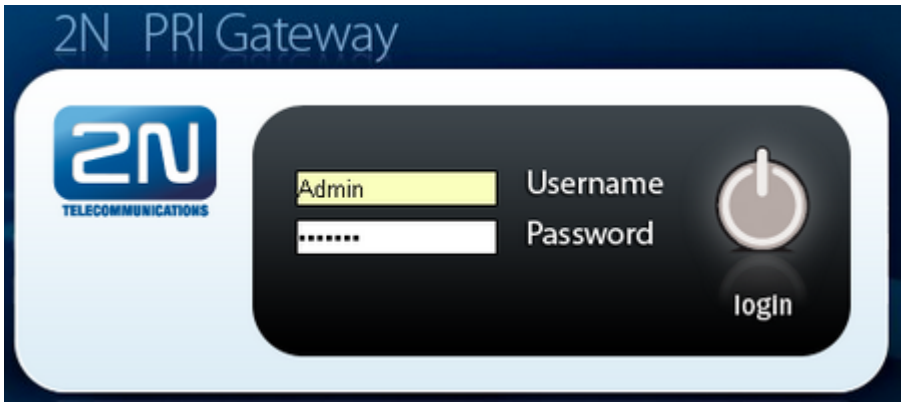


Figure: Web Administration Login Page

After a successful login you get onto the main page of the web application. The window is divided into three parts:

- Left text menu – text with links to available eCPU features.
- Main graphics menu – icons with links to available eCPU features.
- Section with system information:
  - Current firmware version.
  - eCPU serial number.
  - Basic CPU serial number to which the eCPU licence applies.
  - Web interface log-out icon.

Figure: Main Menu

Tip

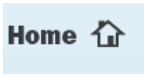
- The active web session is closed after 2 minutes of inactivity or upon the web browser closing.

Note

- Remember to type the **Serial number** and **StarGate serial number** while requesting for a new licence type.

Icons

The web interface uses the icons located on the bottom of the configuration page. The table below describes these icons.

	Save settings
	Reset settings
	Load default settings
	Back to home page
	One step back
	Add new user
	Remove selected item(s)
	Add item
	Refresh item
	Save to local disk

Messaging

This section contains settings for sending/receiving SMS via the POP / SMTP protocols. The main menu is divided into eight SMS delivery groups, which correspond with the GSM outgoing groups in the basic CPU settings (GSM Outgoing Groups).

SMS Delivery Group

This section contains configuration for sending/receiving SMS via GSM outgoing group # (1-8):

- **Distribute incoming messages:**
  - **Message response** – enable/disable SMS Auto Clip Routing for incoming SMS.
  - **VIP numbers** – enable/disable the table of numbers (CLIP) for incoming SMS. An incoming SMS with a CLIP saved in the VIP list will be automatically forwarded to **Deliver SMS to user**.
  - **Deliver SMS to user** – select the users for the **VIP numbers** table and incoming SMS with no record in the SMS Auto Clip Routing table. For how to manage the users see Subs. Management.
- **Automatic answer delivering** A parameter for SMS Auto Clip Routing, which defines the maximum delay between the SMS sending and SMS answering from one and the same GSM number.
- **SMTP/POP3 server settings** Parameters for SMTP and POP3 (SMS

sending/receiving) protocols:

- **Email domain name** – domain for user authorisation (username@email_domain_name).
- **POP3 email subject** – subject of received e-mail, which contains an incoming SMS message. For description of the symbols see the table below:

String	Meaning
%n	Number (CLIP) of SMS sender
%u	Username of SMS addressee
%d	SMS receipt date
%s	IMSI of the SMS-receiving SIM
%v	Parameter %s validity (1=true, 0=false)

- **Maximum number of SMS per email -** set the maximum count of SMS messages to be delivered in one e-mail message.
- **SMTP IP access control** - enable/disable the IP access restriction according to the **SMTP IP access** table.
- **Allow 16-bit SMS** - enable/disable the 16-bit format for SMS.
- **Allow SMS concatenating** - enable/disable division of an SMS longer than 160 chars.
- **Insert email sender to SMS**.
- **Insert email subject to SMS**.

Caution

- The format of the authorisation username requested by your e-mail client is user_name@email_domain_name!

VIP Numbers

A table of numbers (CLIPs) of SMS senders for a selected SMS delivery group. This table is designed for fixed routing of SMS from selected SMS senders to selected SMS users.

Note

- The table of VIP numbers is used only if the **VIP number** parameter in the SMS delivery group is activated!

SMTP IP Access

A table of IP addresses that are granted access to the eCPU via the SMTP protocol. With this table, it is possible to restrict access to the eCPU via the SMTP to prevent potential hacking.

Note

- The SMTP IP access table is used only if the **SMTP IP access control** parameter in the SMS delivery group is activated!

Additional Information

Settings for sending/receiving SMS via SMTP/POP3 protocols

The gateway's internal POP3 server provides SMS downloading from the eCPU via e-mail. Authorisation goes through the USERNAME and PASSWORD, which are used for registration to the web-based interface of the eCPU. Every SMS is changed into e-mail in the **Inbox** directory after successful authorisation of the CPU. The information includes the SMS sender's telephone_number@domain name and the SMS receiver's telephone_ number@domain name (to set the domain name use the web interface; the e-mail header and subject of the message are filled in according to the CPU settings).

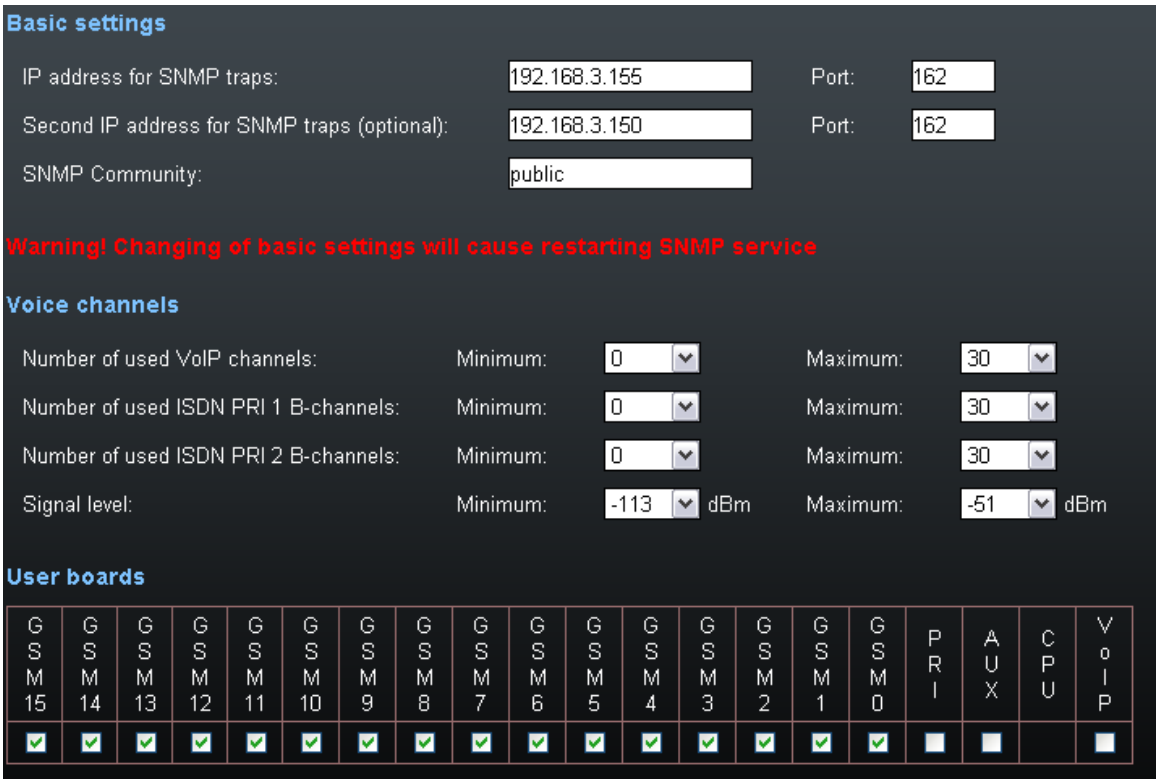
An already read message can be deleted from the POP3 server. You can delete a message from the gateway eCPU or mark it as already read, but the POP3 server cannot see it.

The server awaits e-mail in the format Text/Plain, Text/HTML, Multipart/Mixed or Multipart/Alternative. From a message in the Text/HTML format, only the body of the HTML message without formatting is put into the SMS message. From Multipart/Mixed and Multipart/Alternative messages, only the first part of the message is used, enclosed between strings and mentioned in the header under the **Boundary** name. The server only supports messages in the 7-bit format encoded according to ISO-8859-1 or the 16-bit format encoded according to Unicode UTF-8 (messages with different encoding could be illegible when received in the SMS format).

SNMP Monitoring

This section helps you program sending of SNMP traps (alerts). Find the list of available traps in the so-called MIB table on the installation CD along with this User Manual. The main task of the eCPU SNMP monitoring function is to continuously monitor the GSM gateway states (gateway CPU connection via TCP/IP – Telnet) and, when an error state occurs, send alert to the defined IP addresses. The SNMP agent on the eCPU monitors the following states (some can be user-disabled):

- GSM gateway availability (connected, disconnected).
- GSM/UMTS, PRI, VOIP and AUX card presence/absence.
- Count of active calls via PRI ISDN, VoIP interface.
- Received signal quality for each GSM/UMTS module.
- ISDN line state and GSM/UMTS module error states.



- **IP address, port for SNMP traps**
  Recipient's IP address and IP port for SNMP traps (default IP port = 162). Make sure that this item is completed to make the SNMP process work properly.
- **Second IP address, port for SNMP traps**
  Second recipient's IP address and IP port for SNMP traps (default IP port = 162). If this parameter is filled in, the SNMP trap will be sent both to the primary and secondary IP addresses.
- **SNMP community**
  An SNMP community is the group that devices and management stations running SNMP belong to. Default = public.
- **Number of used channels**
  Use these parameters to define the maximum/minimum counts of active voice

channels (VoIP, PRI ISDN). An SNMP trap will be sent automatically whenever the defined value is exceeded.

- **Signal level**
  Maximum/minimum value of the received GSM/UMTS module signal. An SNMP trap will be sent whenever the defined values are exceeded.
- **User boards**
  Activate/deactivate the positions to enable/disable monitoring of board presence/absence. The CPU board monitoring is always on and cannot be disabled.

Caution

- The SNMP service works only if the following conditions are met:
- The SNMP service is licensed and allowed in the **Management** section.
- The CPU access data are filled in correctly in the **PRI gateway** section.
- The primary IP address, source port and **community** parameter are filled in.

PRI Gateway

Here find the hypertext link to the CPU web interface.

SIM Client

Warning

- This subsection is intended for earlier CPU versions only, which did not provide the SIM Client service in the basic CPU. Your new CPU offers the SIM Client service without requiring the eCPU. Use this service please to make your system work properly!

Call Simulator

The call simulator provides automatic generation of outgoing / incoming calls and SMS messages. With these functions (Call simulator, SMS simulator) activated, the system automatically (according to the predefined rules) sets up calls between the wireless modules and also sends/receives predefined SMS to/from the wireless modules.

Caution

- A valid licence is required for a correct function of the SMS and Call simulators. You have to have a call simulator licence for the Call simulator and an additional SMS licence for the SMS simulator. While uploading the licence, check whether the respective feature is enabled in the **Management** menu.
- By activating this function you may increase your call bill (real calls and SMS).

It is necessary for you to know the phone numbers and IMSI of the SIM card used for a

correct function of the Call / SMS simulators. There are two ways of importing these numbers to the system:

- **Using local IMSI / Phone list** Prepare a CSV file (divided by space) for data importing with all the required SIM card data.
  230013001547875 731123446
  230014120587987 605123446
- **Using remote database of 2N® SIM Star Server** Add the remote server IP address and the IP port (default is **12349**). Make sure that this feature is also enabled on **2N® SIM Star Server** (**SIM server management > Connections**).

IMSI/Phone servers
Call simulator needs to know phone numbers of SIM cards used for simulation.
IMSI/Phone servers can distribute IMSI numbers of SIM cards and assigned phone numbers.
Another facility is using of IMSI/Phone list.
You can define servers they offer IMSI/Phone distribution service.
For example SIM Star Server can do this.
Server 1
IP:
192.168.1.150
Port:
12349

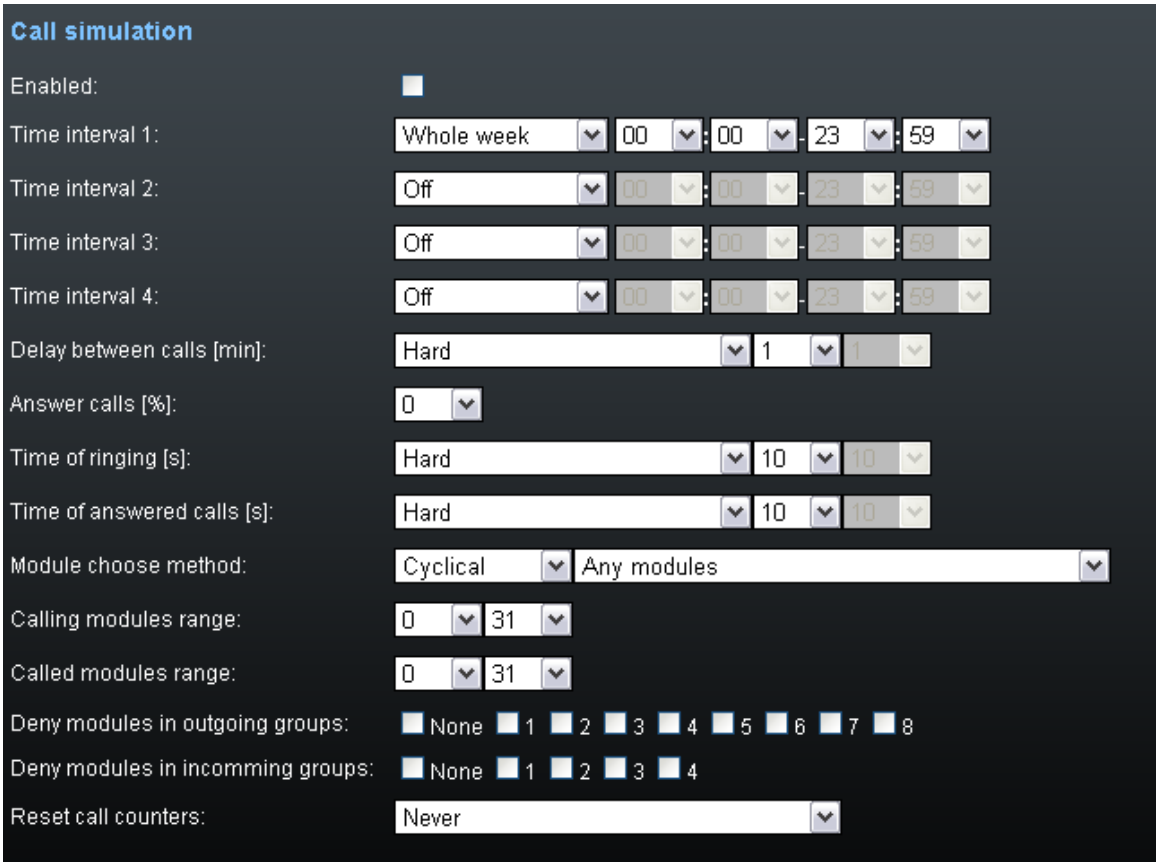
Configuration

The configuration is divided into two sections. You can enable/disable each function independently.

- **Call simulation**
  Settings for automatic call generation between the gateway wireless modules.
- **SMS simulation**
  Settings for automatic SMS generation between the gateway wireless modules.

Call Simulation

- **Time interval 1-4**
  Up to 4 time intervals for call simulation.
- **Delay between calls**
  Time in minutes between two automatic calls. You can choose **Hard** (every defined count of minutes) or **Random** (randomly between two intervals in minutes).
- **Answered calls**
  Ratio of connected calls. Example: If you set 50%, every other call will only be answered.
- **Time of ringing**
  Length of ringing calls before automatic connection or call end.
- **Time of answered calls**
  Length of active / connected calls between two modules.
- **Module choose method**
  A way of using wireless engines for calls:
  Calling / called module range
  - Cyclical – wraparound using of defined wireless engines;
  - Random – random use of defined wireless engines.
- A group of wireless engines to be used for the Call simulator.
- **Deny modules in outgoing groups**
  Disable the modules for outgoing call simulation.
- **Deny modules in incoming groups**
  Disable the modules for incoming call simulation.
- **Reset call counters**
  Enable the call counter reset for call simulation.
- **Call limit for each module**
  Set the call limit for each module**.**
- **Call limits of time intervals**
  Set the call limits for up to 4 time intervals.
- **Reset minutes counters**
  Enable the called minutes counter reset for call simulation.
- **Minutes limit for each module**
  Set the outgoing call minutes limit for each module.
- **Minutes limits of time intervals**
  Set the outgoing call minutes limits for up to 4 time intervals.



SMS Simulation

- **Time interval 1-4**
  Up to 4 time intervals for SMS simulation.
- **Delay between messages**
  Time in minutes between two automatic SMS. You can choose **Hard** (every defined count of minutes) or **Random** (randomly between two intervals in minutes).
- **Module choose method**
  A way of using wireless engines for SMS messages:
  Sending / Receiving module range
  - Cyclical – wraparound using of defined wireless engines;
  - Random – random using of defined wireless engines.
- A group of wireless engines to be used for the SMS simulator.
- **Deny modules in outgoing groups**
  Disable the outgoing call modules for SMS simulation.
- **Deny modules in incomming groups**
  Disable the incoming call modules for SMS simulation.
- **Reset SMS counters**
  Enable the SMS call simulator counter reset.
- **SMS limit for each module**
  Set the sent SMS limit for each module.
- **SMS limits of time intervals**
  Set the sent SMS limit for up to 4 time intervals.

Note

- The SMS simulator uses SMS messaging for sending/receiving SMS. All received SMS messages are saved to the **sms** account.

Management

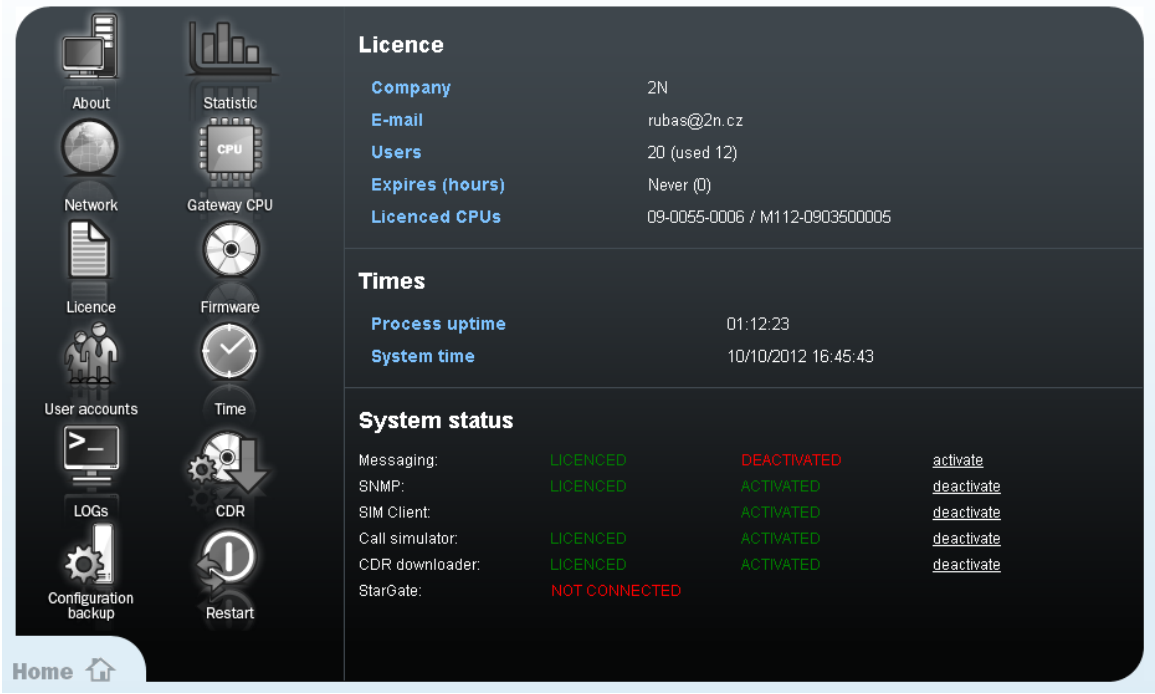
The status screen for all the above mentioned functions and additional eCPU configuration. The window is divided into four sections:

- **Licence**
  Information on the current licence state and potential licence expiration.
- **Times**
  The current system time and up time of the eCPU.
- **System status**
  States of all eCPU functions. You can enable/disable each function manually.

Caution

- You have to activate the requested function before use.

- **Icon list**
  Additional eCPU configuration and management.



Icon List

- **About**
  Information on the manufacturer.
- **Statistics**
  Statistics of connected gateway.
- **Network**
  The eCPU IP settings. If you save wrong parameters, you can restore the correct IP parameters using a serial console.
- **Gateway CPU**
  The IP address and access data of the gateway basic CPU.
- **Licence**
  An item for uploading a new licence for the eCPU (NOT the main CPU).
- **Firmware**
  An option to upload new firmware (format PGW-x-x-x) for the eCPU. Please be patient in the case of a narrow connection bandwidth because the firmware size is about 9MB.

> **Caution**
> - Be sure to use original and undamaged firmware files for the firmware upload to avoid gateway function problems! For the latest firmware version see our websites (**www.2n.cz**).

- **Time**
  The eCPU does not contain a clock generator of its own. It is necessary to synchronise it from any place. You can choose an NTP server or the basic CPU of the gateway.
- **LOGs**
  Here you can set and download the eCPU status log records.
- **Configuration back-up**
  An option to download the complete eCPU settings.
- **Restart**
  Reboot of the eCPU. You are recommended to use this function instead of the hard reset by switching off / on the whole system.
- **CDR**
  An automatic CDR download from the basic CPU to the micro-SD card located on the eCPU board (enhanced CPU Board). When the CDR function is activated, all CDR will be automatically downloaded and saved onto a micro-SD card. The saved CDR are available for download in this section of web interface.

> **Caution**
> - The micro-SD card must be formatted according to the FAT32 system!
> - The CDR function will not start until the SD card is inserted in the system!

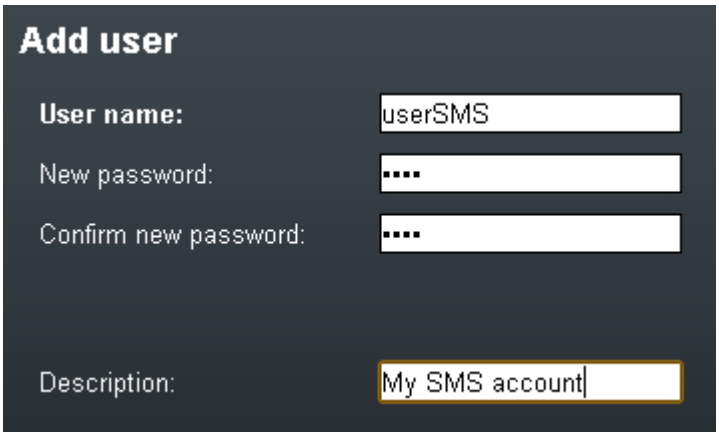
- **User accounts**
  Management of the users that can access the web interface or use SMS services. The users are divided into nine groups. Group 0 is for service accounts, groups 1-8 are designed for SMS delivery groups 1 – 8.

Tip

- If you forget the Admin user password, you can restart the gateway with restoring the factory settings using a serial console.

Service account	Description
Admin	Account for configuration eCPU
simstar	Account for SIM Client
sms	Account for SMS and SMS simulator

The access user name and password have the same format as with the SMTP/POP3 protocols (username@domainname).The default accounts are added by the default settings (one per User group). Click on the **Add user** icon to add a new account to the system.



SMS User Interface

Added users authorised for SMS receiving/sending may log in to the eCPU web interface with the user password and name.

The logged-in users have limited eCPU configuration rights.

Note

- The access user name and password have the same format as with the SMTP/POP3 protocols (username@domainname).

You can do the following in the **Messaging** section via the web interface:

- Read and delete delivered SMS.
- Delete SMS to be sent.
- Review unsuccessfully sent SMS.
- Create new SMS and send SMS.

3.5 2N® External Routing Machine

Installation

CD Image

An automatic installation CD (part No. 507424E) has been created for installation purposes. This installation CD automatically prepares the system and installs the requested application.

Hardware Requirements

Minimum PC Hardware Requirement	
Procesor	Intel P4, 2,4GHz or higher
RAM	2048 MB RAM
HDD	60GB SATA
CD-ROM	Only CD-R
LAN	Ethernet 100BaseT

Note

- The ERM web interface is available in versions ERM v4 and higher!

Installation Procedure

Caution

- By using the installation CD you remove ALL data from the hard drive!

This installation is automatic and requires a very low user interaction.

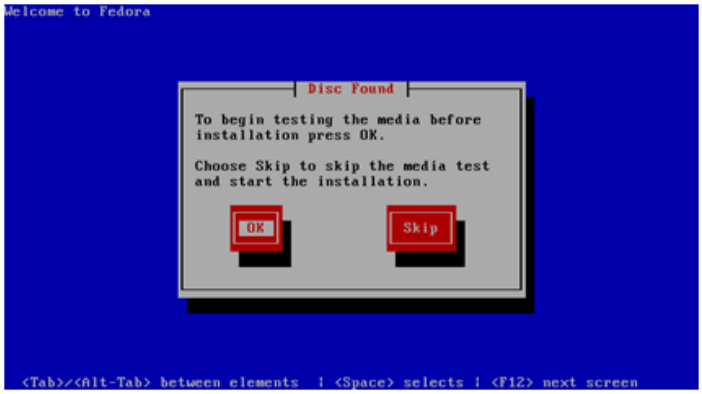
Follow the instructions below to install a perfectly working system.

Set your PC to use the CD ROM as the default boot device.

Place the installation CD into the CD ROM.

After starting your PC, you will get the following screen. You can choose any of the available booting options. Automatic installation is the first option and will start in 3 seconds.

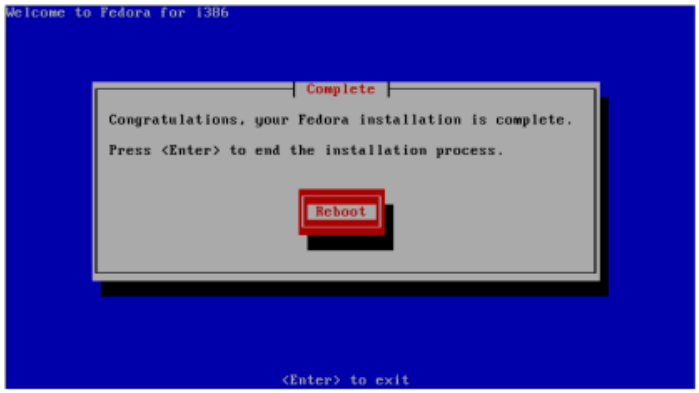
Welcome to 2N Instalation CD
Automatically Install new system
Install or upgrade an existing system
Install or upgrade an existing system (text mode)
Rescue installed system
Boot from local drive
Memory test
Press [Tab] to edit options
Automatic boot in 2 seconds
TELECOMMUNICATIONS


Welcome to Fedora
Disc Found
To begin testing the media before installation press OK.
Choose Skip to skip the media test and start the installation.
OK
Skip
<Tab>/<Alt-Tab> between elements | <Space> selects | <F12> next screen

You can test the installation CD before installation. Choose **OK** to test the CD or **Skip** to continue the installation process.

The installer will automatically format the hard drive and install all system files. When the installation is finished, the installer will wait for reboot confirmation. Press ENTER to continue.

Remove the CD from the CD ROM and let the new system boot.



To finish the system settings log in as the Admin user with the 2n password.

The wizard will help you set the network and install the package correctly.

Network Settings

You can set the network during the first login. A graphical wizard will help you set the IP address, network mask and default gateway. Use **TAB** to move between options. Use **SPACE** to select or unselect options. You can also change the IP by running the command set-up.

Time Zone and Time Synchronisation

Because the routing rules are based on time and date, be sure to set the correct time zone and synchronise time. For time synchronisation use the NTP protocol and so you need the Internet connection.

Package Installation

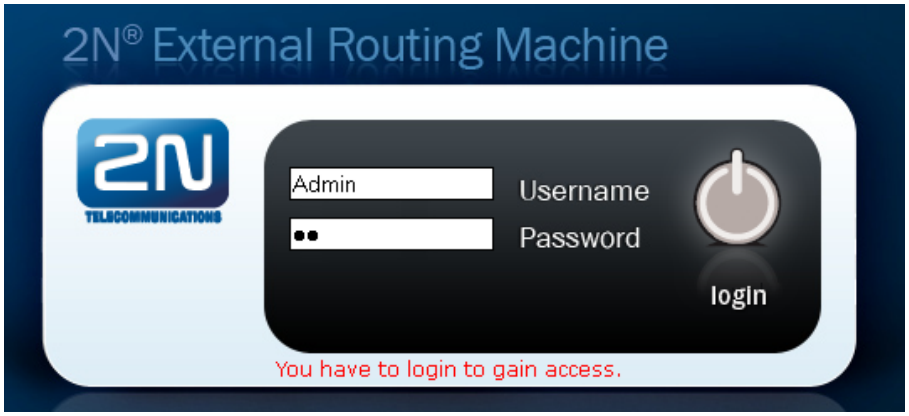
Choose the package to be installed. You can choose either the **2N® ERM** or **2N® SIM Star Server** application.

Configuration via WEB interface

Enter **http://IP_address_PC/erm** into your browser address row to access the ERM web interface.

Caution

- The manufacturer supplies the gateways with a predefined default user account **Admin** with default password **2n**. Mind the Upper/Lower Case while entering the user name and password! The first thing you should do for safety reasons after putting your gateway in operation is to change the administrator password.



Gateway Connection

Access the ERM configuration via the web interface sections. Use this interface to fully configure the ERM and manage the database table records.

The configuration consists of the following sections:

- **Gateways** – section for information related to the gateway, the maximum number of connected gateways is 100.
- **Database**– for manage all database tables concerting ERM.

- **INC tables –** routing of incoming calls from GSM/UMTS
- **Out tables –** routing of outgoing calls according Calling party number (CLIP)
- **Black & White tables –** outgoing calls routing according to Black & White CDN list
- **Clip tables –** routing of outgoing calls according to Called party number
- **Phonebook –** telephone directory table (for **2N® NetStar** system only).

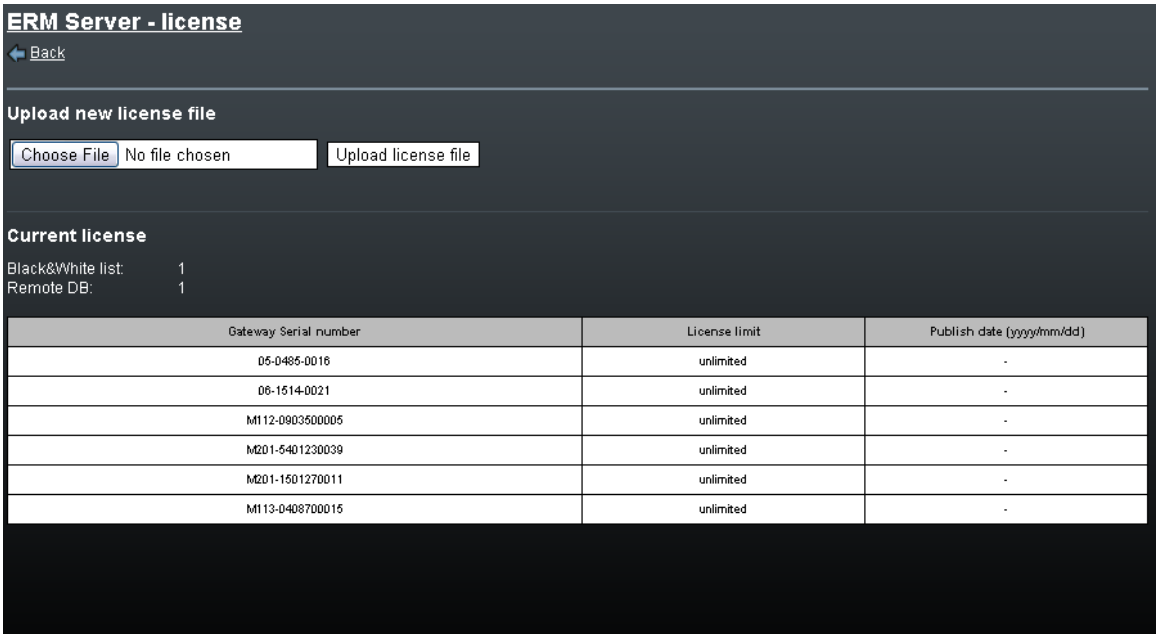
- **ERM Management** – section for general configuration of ERM.

> ⚠ The **2N® ERM server** will not become functional until the ERM licence file is uploaded.

Licence

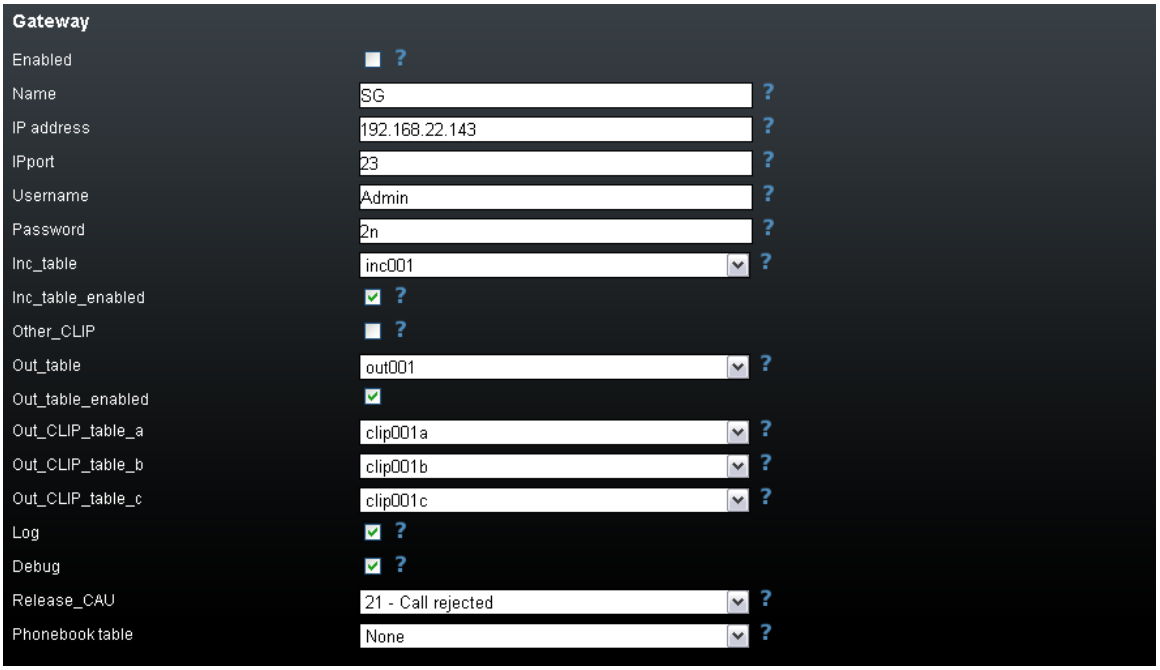
The ERM licence is per gateway connection. The licence is generated by the 2N Technical Support and based on the gateway serial number.

Upload the current licence file via the ERM web interface (ERM Management – Licence).



Gateway Section

The Gateway section contains the following items:

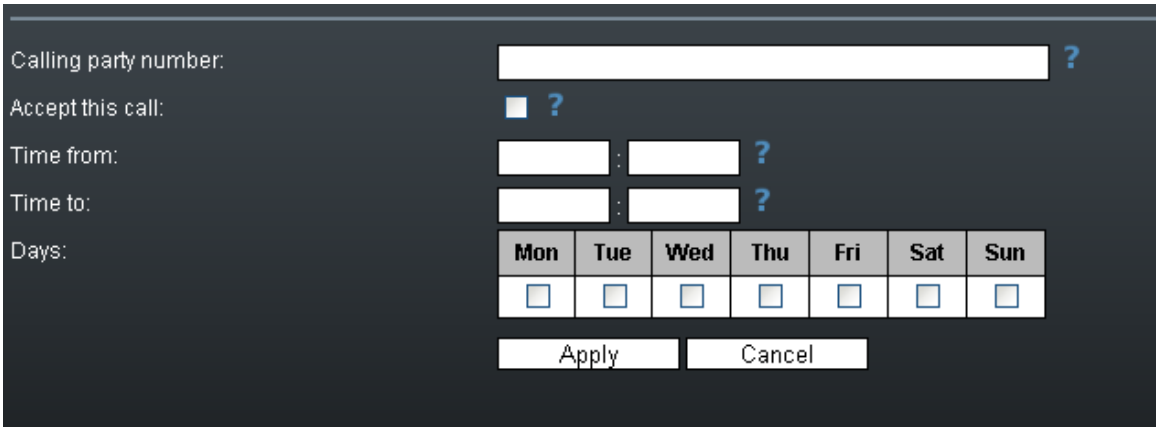


Key	Value	Description
Enabled	0 or 1	Activates (1) or deactivates (0) the use of the gateway.
IPaddress	IP address in format xxx.xxx.xxx.xxx	Remote GSM gateway IP address. Set this connection for ERM remote control.
IPport	IP port number	Remote gateway communication port (default=23).
Username	String	Username for gateway access through the Telnet protocol (default=2n).
Password	String	Password for gateway access through the Telnet protocol (default=2n).

Inc_table	inc001 to inc100	Name of the table that includes record for incoming GSM call filtering. One table may be shared by multiple GSM gateways.
Inc_table_enabled	True or False	Enables (True) or disables (False) filtering of incoming calls.
Other_CLIP	0 or 1	Determines whether an identified GSM CLIP shall be rejected (0) or received (1).
Out_table	out001 to out100	Name of the table used for outgoing call routing. One table may be shared by multiple GSM gateways.
Out_CLIP_table	clip001 to clip100	Name of the table used for outgoing call routing. One table may be shared by multiple GSM gateways.
Out_table _enabled	True or False	Enables (True) or disables (False) the use of the Out_table.
Log	0 or 1	Activates (1) or deactivates (0) LOG generation.
Debug	0 or 1	Activates (1) or deactivates (0) debug generation.
Release_CAU	Number 1-255	ISDN releases CAU which is sent if a call is rejected (default=21).
Phonebook table	phonebook001-phonebook100	Name of the telephone directory table (for the **2N® NetStar** system only).

Inc Table

This table is used for filtering incoming calls from GSM networks.



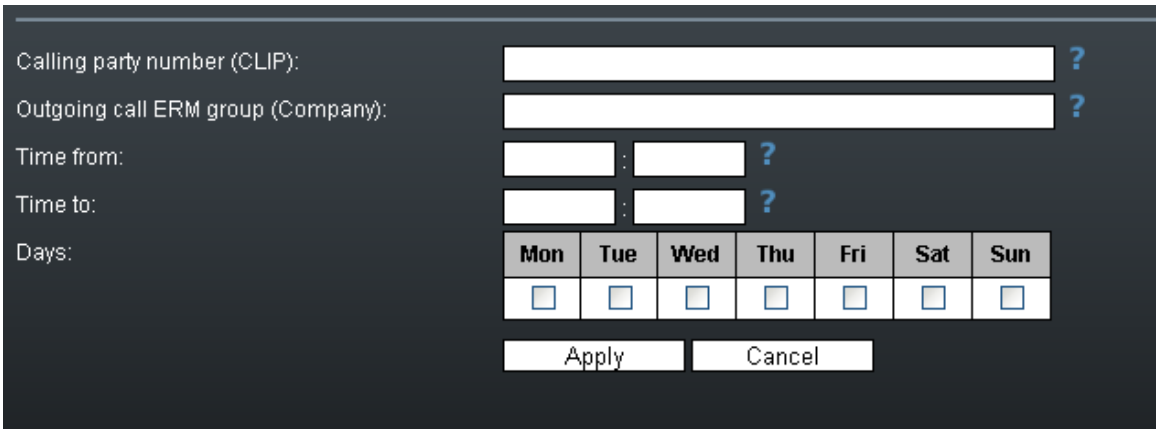
- **CLIP** - enter the strings to be directly compared with the CLIP received.
- **Restriction** - enter the value to be assigned to each CLIP determining whether the incoming call with the CLIP shall be rejected (O) or received (1).
- **Time from** - set the beginning value of the time interval (hh:mm) for the selected rule.
- **Time to** - set the end value of the time interval (hh:mm) for the selected rule.
- **Day** - define a day in the week on which the rule shall be applied (1= Monday, …, 7 = Sunday).

Incoming table structure:

CLIP	Restriction	Time from	Time to	Day
+420605234354	1	00:00	12:00	1234567
+420775234091	0	12:00	24:00	1234567

Out Table

This table is used for identification of the subgroup from which the call is coming. The search result is used for search in the clip_table.



- **CGP** - enter the strings to be directly compared with the CLIP received. The '_'

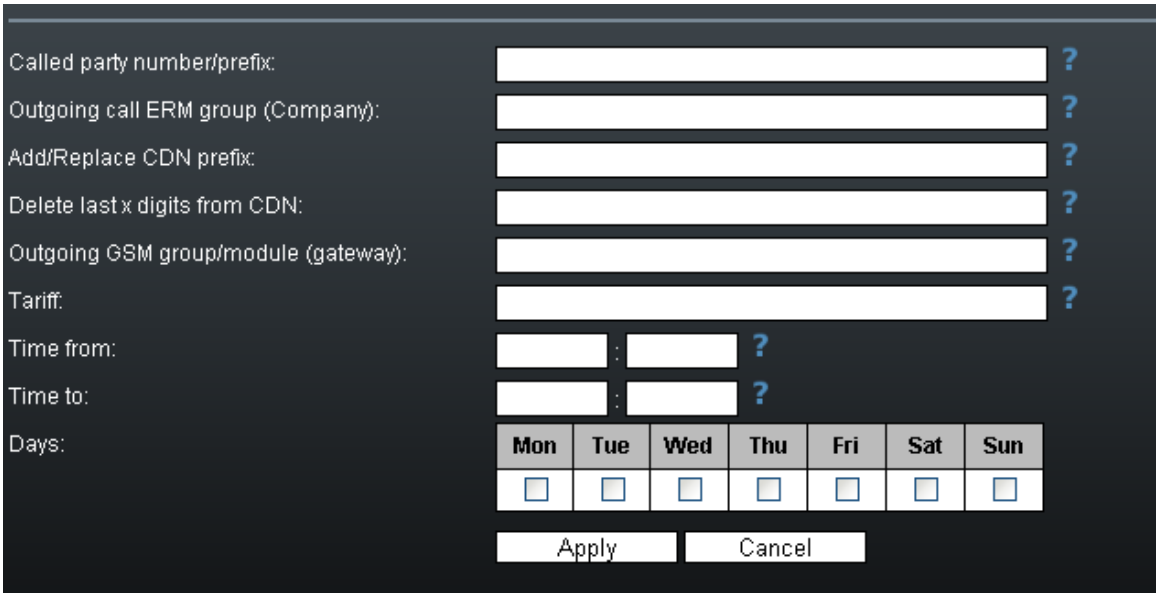
character is used as a masking character for one numeric character.

- **Company** - set the value to be assigned to each CGP determining to which subgroup the CGP is assigned. If there is no match, the received CGP is assigned to subgroup 0.
- **Time from** - set the beginning value of the time interval (hh:mm) for the selected rule.
- **Time to** - set the end value of the time interval (hh:mm) for the selected rule.
- **Day** - define a day in the week on which the rule shall be applied (1= Monday, …, 7 = Sunday).

Out table structure:

CGP	Company	Time from	Time to	Day
261301___	1	00:00	12:00	1234567
2353215__	2	12:00	24:00	1234567
261333111	100	00:00	24:00	1234567
261333222	101	00:00	24:00	12345

Clip Tables



- **Prefix** - define the received called number or a part of it (the number is checked from the left).
- **Company** - use this parameter to define to which subgroup the rule is to be applied.
- **Change prefix** - use this parameter to modify the number to be dialled. The '-' character removes one character from the left side of the called number. The other characters are added to the called number beginning.
- **Delete last** - use this parameter to remove characters from the right-hand side of the called number. The value defines how many characters should be

removed.

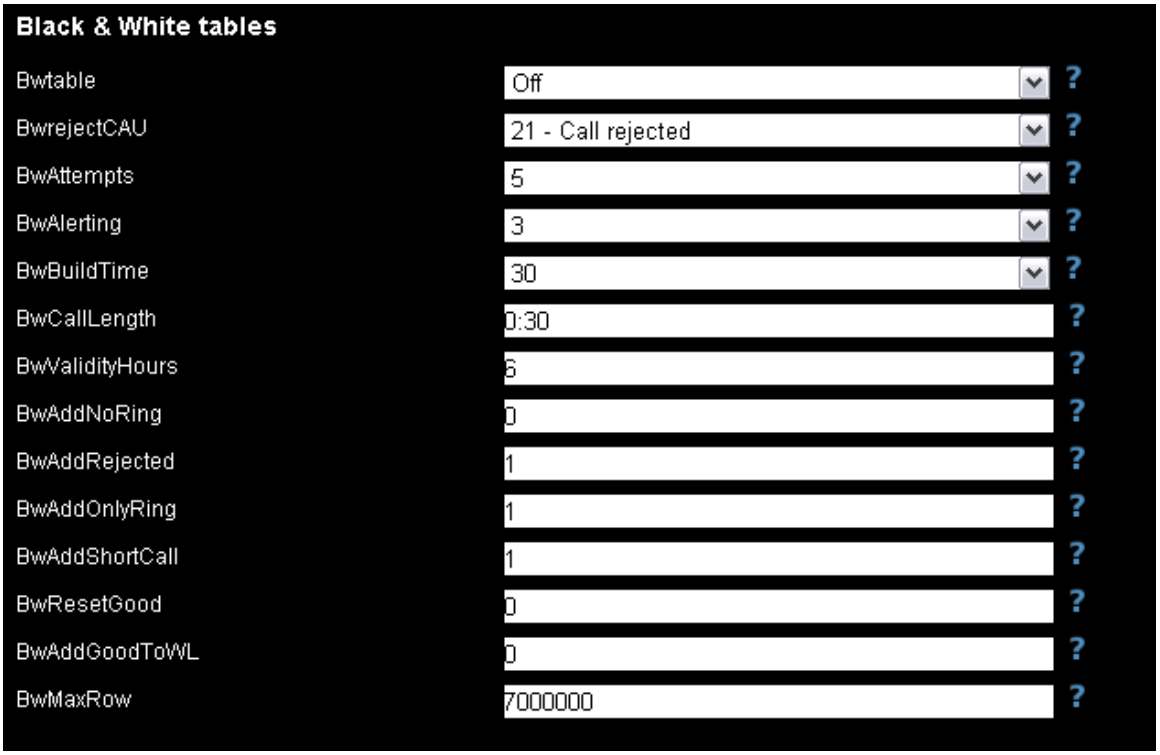
- **Out group** - use this parameter to specify the outgoing group for call routing. If the group is set to 0, the call will be rejected. For direct routing to a selected GSM module, use G##, where ## is number of GSM module.
- **Tariff** - use this parameter to specify the Tariff number.
- **Time from** - set the beginning value of the time interval (hh:mm) for the selected rule.
- **Time to** - set the end value of the time interval (hh:mm) for the selected rule.
- **Day** - define a day in the week on which the rule shall be applied (1= Monday, …, 7 = Sunday).

Clip table structure:

Prefix	Company	Change prefix	Delete last	Out group	Time from	Time to	Day
605205697%	1		0	129	00:00	12:00	1234567
605205697#%	4		1	9	12:00	24:00	1234567
605%	1	#31#	0	129	00:00	24:00	1234567
605%	2	+420	0	349	00:00	24:00	1234567
0605%	3	-#31#	0	59	00:00	24:00	1234567
608%	1	#31#+420	0	0	00:00	24:00	1234567
%	1		0	9	00:00	24:00	1234567
%	100		0	G10	00:00	24:00	1234567
%	101		0	G1	00:00	12:00	1234567
%	101		0	G12	12:00	24:00	1234567

Black & White Tables

Set the rules to disable routing for calls that failed to meet the set parameters before, such as unconnected calls, short calls, rejected calls, and so on.



Black & White tables		
Bwtable	BW001-BW100	Name of the B&W table.
BwrejectCAU	Number 1-255	ISDN releases CAU to be sent if a call is rejected (default=21).
BwAttempts	1 – 50	Number of attempts before the record change to restricted.
BwAlerting	0 – 30	Minimum length of the Outgoing call alerting state.
BwBuildTime	0 – 45	Maximum length of Call building.
BwCallLength	mm:ss	Minimum length of the active call.
BwValidityHours	0, 1-999	Validity time of a record in the database. If you set 0 there is no time limit for records.
BwAddNoRing	0, 1	Call with no ringing state will be marked as "faulty".
BwAddRejected	0, 1	Rejected call will be marked as "faulty".
BwAddOnlyRing	0, 1	Call with ringing state and no active state will be marked as "faulty".
BwAddShortCall	0, 1	Short call will be marked as "faulty".
BwResetGood	0, 1	One outgoing call that is not marked as "faulty" will restore BWAttepmts counter back to "0".
BwAddGoodToWL	0,1	One outgoing call that is not marked as "faulty" will be automatically added to the whitelist.
BwMaxRow	0, 20000–7000000	Maximum number of records in the selected database table.

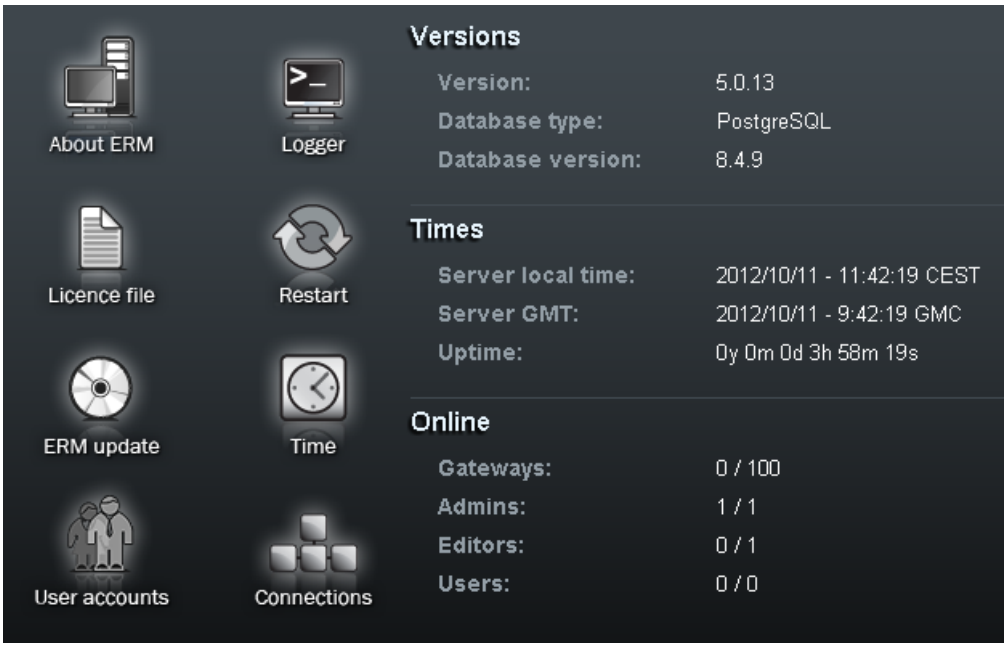
The BW table records can have three different states.

- 0 – **White list** – the record is enabled.
- 1 – **Counting** – the record is in the state of counting. When the threshold value is reached, a change in the Black List will occur.
- 2 – **Black list** – the record is disabled.

B&W table structure:

Called party number	Length of Alerting state	Buildtime	Length of connected call	Release cause	Number of "wrong" calls	TimeStamp	State of record
601123456	15	10	00:33:00	1	3	2012-10-22 13:21:05	1

ERM Management



Versions

This section provides information on the firmware versions.

- **Version** – gives information on the firmware version.
- **Build** – gives information on the firmware build version.
- **Database type** – gives information on the database type.

Times

This section provides information on the **2N® ERM Server** times.

- **Server local time** – gives the **2N® ERM Server** local time derived from the time zone defined.
- **Server GMT** – gives the **2N® ERM Server** time without time shift. GMT stands for the Greenwich Mean Time and is taken over directly from the BIOS.
- **Uptime** – gives the time from the last OS power up.

Online

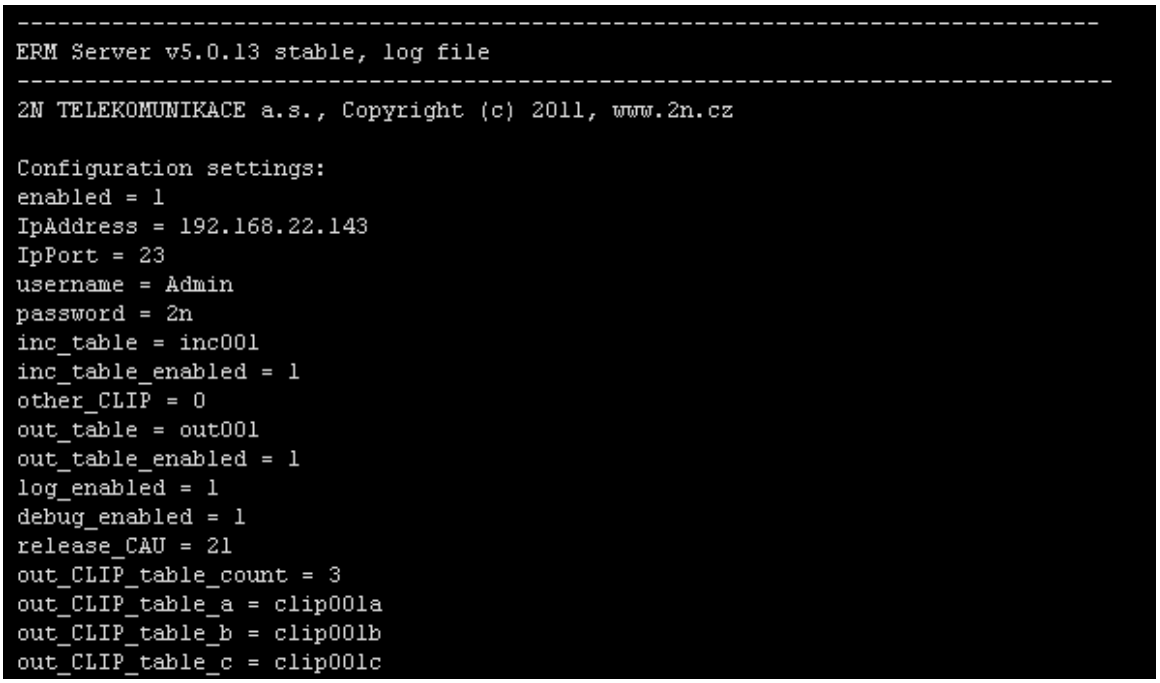
This section provides information on the count of currently connected gateways and users.

About ERM

The menu provides essential contact information on the 2N TELEKOMUNIKACE a.s. company. You will find here the address, telephone and fax numbers and e-mail address of the Sales Department and Technical Support as well as a link to the 2N web sites.

Logger

The menu provides view LOG records in **2N® ERM Server**. The records are marked with a timestamp.



Licence File

Some **2N® ERM Server** functions and GSM gateway connections are subject to licences. To manage the licences use this menu.

- **Current licence limitations**
  Check whether your current licence includes the following two system functions. These functions are subject to licence:
  - **Black&White list**
  - **Remote DB**
- **Licensed gateways**
  The section displays a list of serial numbers of all the GSM gateways that may be used with **2N® ERM Server**. **2N® ERM Server** cannot be connected to gateway types other than those listed here. Every record also includes information on the licence expiry.
- **Upload new licence file**

The section helps you upload a new licence file. Select the file location using the **Browse** button and push **Upload licence file**.

Restart

- **Restart ERM Server**
  Use this option to restart **2N® ERM Server**.
- **Load default configuration and restart ERM Server**
  Use this option to load default canfiguration and restart **2N® ERM Server**.
- **Load default database configuration**
  Use this option to load default canfiguration **2N® ERM Server**.

ERM Update

This section helps you update your **2N® ERM Server**. Select the file location using the **Browse** button and push **Upload update file**.

Time

This section helps you set the **2N® ERM Server** time.

User Accounts

This section helps you add/remove/edit the user accounts. The following two accounts are available in the default setting.

Username	Password	Privileges
2n	2n	Editor
Admin	2n	Admin

Connections

This section helps you monitor the connected users.

ERM Control

The erm user is used for administration purposes. To log in as the erm user use the ermserver password. The ERM is controlled and administered by the erm utility. To launch this utility use the following syntax (the statement values are not case sensitive):

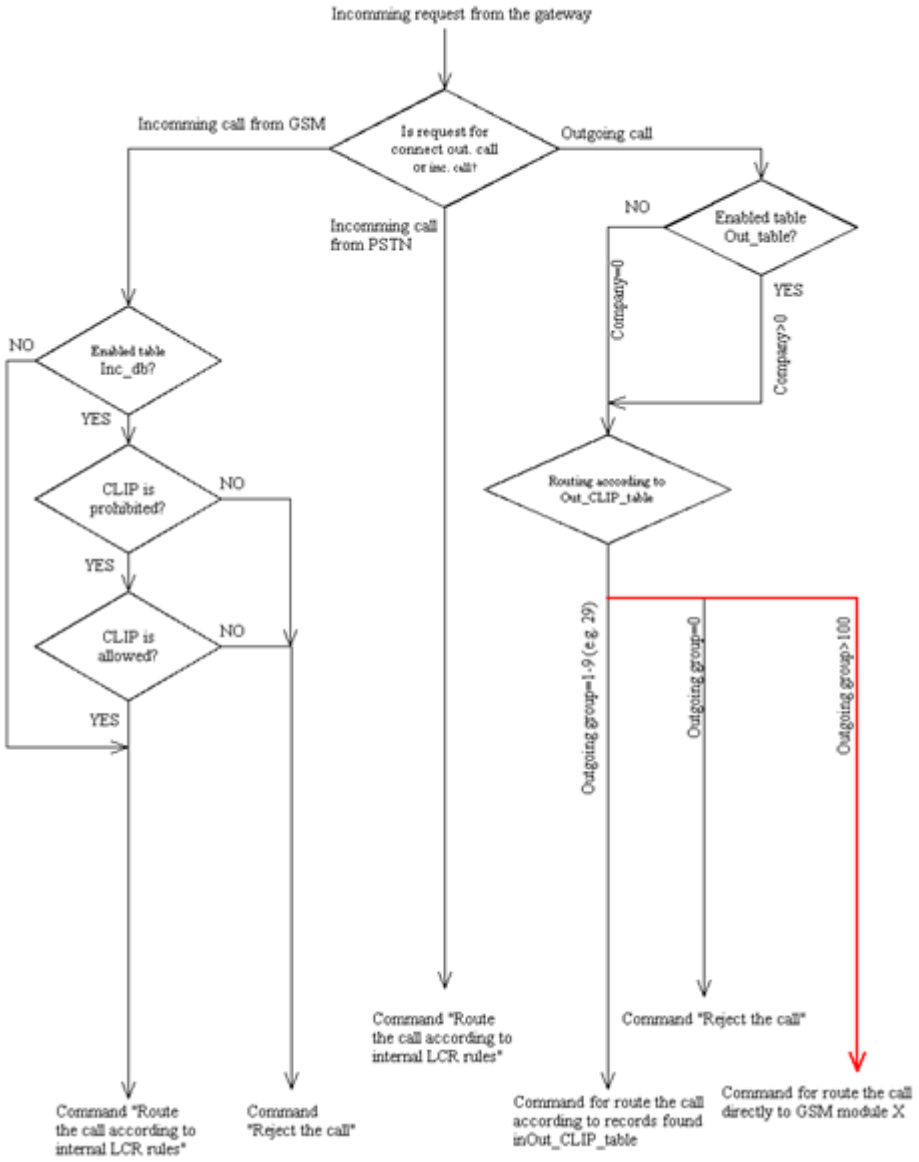
erm statement parameters

Statement	Action
start	Launches the ermserver service. If the service is running, it writes out a report and terminates operation.
stop	Terminates the ermserver service. Unfinished requests, if any, are completed.
restart	Restarts the ermserver service.
Status	Writes out the ermserver service status, i.e. whether or not it is running.
import <db_name> <CSV_file> <replace_duplicates>	Imports a new record into database table: **<db_name>** - name of the database table to be used for import. **<CSV_file>** - name of the CSV file to be used for import. If the file is unavailable in the current directory, the full path has to be listed. The CSV file values are separated with a comma (0x2C). The structure of all related tables is described in the ERM database structure section. **<replace_duplicates>** - sets whether duplicate lines should be replaced (True) or kept (False). Example of usage: **erm import clip001 clip001.csv true**
export <db_name> <CSV_file>	Exports the database table to the CSV file.Example of usage: **erm export clip001 clip001_backup.csv**
Erase <db_name>	Deletes the content of a selected database table.Example of use: **erm erase clip001**
Copy <source_db_name> <dest_db_name>	Copies the database table: **<source_db_name>** - name of the source table; **<dest_db_name>** - name of the destination table.Example of usage: **erm copy clip001 clip002**

Description of ERM Function

After start, the ERM is connected automatically to the defined GSM gateways, activating the external call routing process in them. During this process, the GSM gateway automatically sends information on any new call to the ERM and awaits reply with call instructions within 2 seconds. If no reply comes from the ERM within this timeout, the call is routed according to the internal routing tables.

The functional diagram below shows the request processing procedure:



3.6 2N® SIM Star System

Product Purpose

2N® SIM Star offers:

- Central administration for all of your SIM cards.
- Central and safe location for all of your SIM cards.
- Elimination of SIM card replacement costs for GSM/UMTS gateway locations.
- High capacity for your SIM cards due to extensive scalability.
- Simple integration in your existing IP solution due to standard Ethernet interface connection.

2N® SIM Star Key Components

- CPU–SIM Client – the card converts data from/to the GSM/UMTS card on the Ethernet interface.
- SIM Star GSM/UMTS board – a card designed for the **2N® StarGate / BlueTower** gateway. This card replaces the existing GSM/UMTS cards in the respective gateway. The new solution enables connection to the SIM Client card.
- SIM board – includes as many as 32 SIM cards, converts data from/to the Ethernet interface.
- SIM board box – a 3U rack designed for up to 18 SIM boards. The SIM box works as a traditional Ethernet switch that provides comfortable connection and storage of SIM boards.
- **2N® SIM Star Server –** a rack–mounted PC that provides seamless integration of the system and allocates the GSM/UMTS module SIM cards according to the user–defined rules. **2N® SIM Star Server** includes a web interface for easy and user–friendly system configuration and control.

SIM Client Configuration

The SIM Client service is launched automatically upon the CPU start and need not be configured. As the service uses **the same IP address / acess name / password as the CPU**, you have to know these data before configuring **2N® SIM Star Server.** For additional information refer to the **2N® SIM Star** User Manual**.**

The SIM Client communicates with the other **2N® SIM Star** parts via an Ethernet interface and using the following IP ports:

TCP/UDP port	Description
1500 / TCP	Connection with **2N® SIM Star Server**
10000-10031 / UDP	Connection with SIM boards
12349 /TCP	Connection of eCPU Call simulator to **2N® SIM Star Server**

Remember to activate and correctly set the SIM Client process to ensure a proper function of the gateway in the **2N® SIM Star** system.

The **2N® SIM Star** system takes over some features from the basic CPU system. For additional information refer to the **2N® SIM Star** User Manual.

4. List of AT Commands

The protocol is derived from a standard AT protocol used for modems and GSM modules. The command format is AT[command]<CR>, or AT[command]<CR><LF> irrespective of the case. The response contains no or a few text lines, an empty line <CR><LF> and the response type: OK, ERROR or BUSY. To repeat the last command, enter A/<CR>.

Here is what you can find in this section:

- 4.1 Basic Commands
- 4.2 Configuration Commands

4.1 Basic Commands

System Information	
ATI3	Firmware version and copyright
ATI4	Factory number
Statistics	
AT&T	Statistics of calls via PRI interface
AT&TIN	Statistics of incoming calls via GSM modules
AT&TOUT	Statistics of outgoing calls via GSM modules
AT&T##	Statistics of calls via SIM cards of GSM module ##
AT%TPR=mi,ci,mo,co	Setting of statistics via PRI
AT%TG0=mi,ci,0,0	Setting of statistics of incoming calls via all GSM modules in GSM group 0
AT%TG#=mi,co,ri,ro	Settings of statistics of GSM group #
AT%TGALL=mo.co,ri,ro	Settings of statistics of all GSM groups
AT%T##=#,mi,ci,si,mo,co,so	Settings of statistics of SIM card # of GSM module ##
AT%T##=ALL,mi,ci,si,mo,co,so	Settings of statistics of all SIM cards of GSM module ##
AT%TALL=ALL,mi,ci,si,mo,co,so	Settings of statistics of all SIM cards of all GSM modules
Description of parameters:	Mi/mo > Minutes of incom./outg. callsCi/co > number of connected incom./outg. callsRi/ro > number of re-routed incom/outg. calls in groupSi/so > number of received/sent SMS messages
! When you change these parameters, all the other counters will be reset!!	

Wireless Engines	
AT&Q##	Received GSM signal level (##=00-15)
AT&QALL	Received GSM signal level from all GSM modules
AT&Gxx=atcmd	Send command for AT commands directly to the GSM module
	AT&Gxx=at+cnum – SIM card telephone number AT&Gxx=at+cpin="xxxx" – PIN entering AT&Gxx=at+clck="sc",1"xxxx" - PIN request enable AT&Gxx=at+clck="sc",0"xxxx" - PIN request disable
LOG and CDR List	
AT&L	Log file listing (PRIGW awaits pressing of the Space bar in every 20 rows)
AT&C	Call file listing (PRIGW awaits pressing of any key in every 20 rows)
AT&CR	Call file listing and deleting (PRIGW awaits pressing of the # key to delete this row /with call info/ from memory and sends the next row)

4.2 Configuration Commands

Status Information	
AT&V	Overview of all system settings
AT&VI	Overview of ISDN PRI settings
AT&V0	Overview of basic GSM settings
AT&V#	Overview of GSM group # settings (#=1-8)
AT&VALL	Overview of all GSM group settings
AT&N#	Overview of parameters of network list # (#=1-8)
AT&NALL	Overview of parameters of all network lists
AT&R	Overview of LCR lines
Default Reset	
AT&FRES	Reset with gateway factory settings

System Settings	
AT%S70=x.x.x.x	IP address
AT%S71=x.x.x.x	IP address mask
AT%S81=	Initialisation string for setting of mode connected to the gateway COM2
AT%S90=x	Type of assignment of B-channels to GSM modules (0-rotating; 1-locked; 2-according to credit)
AT%S91=x,y	Way of call information recording (0- no record; 1- successfully connected outgoing call; 2- successfully connected incoming calls; 3- successfully connected incoming and outgoing calls; 5- all outgoing calls; 6- all incoming calls; 7-all incoming+outgoing calls) Y = to each call add NET info (1) or no (0)
AT%S93=x	Global selection of SIM card (0= according to GSM group, 1-8= number of SIM holder)
AT%S98=xxxx	PIN code for SIM cards inserted in the gateway
AT%S99= dd.mm.yy.w/ hh:mm:ss	Gateway date and time settings
AT%X00=hout,hin,min	Automatic logout of GSM moduleshout ...hour when the modules start to log out randomlyhin ...hour when the modules start to log in randomlymin ...minimum number of modules in a group (2..15) that always remain logged-in
AT%X80=name/pass	Username/password for access via IP port (this parameter is write only- you cannot see its value)

System Control	
AT&Bxx=DOWN	Transfer of GSM board xx into the sleep mode
AT&BPR=DOWN	Transfer of PRI board into the sleep mode
AT&BALL=DOWN	Transfer of all GSM boards into the sleep mode
AT&Bxx=RESET	Reset of GSM board xx
AT&BPR=RESET	Reset of PRI board
AT&BALL=RESET	Reset of all GSM boards
AT&BSYS=RESET	Reset of PRIGW
AT&Gxx=RESET	Reset of GSM module xx
AT&Gxx=BLOCK	Block of GSM module xx
AT&Gxx=DOWN	Transfer of GSM module into the sleep mode
AT&Gxx=ON	Transfer of GSM module into the idle mode

ISDN PRI Board	
AT%I00=	ISDN PRI port type (TE/S ; TE/M ; NT/S ; NT/M) or VoIP = SIP
AT%I01=x,y	X - TEI ISDN PRI connections (0-63) Y – CRC (0=off, 1=on)
AT%I05=c1,c2,c3,c4	Number of causes sent to ISDN PRI (in ReleaseComplete) whenever an incoming call from ISDN PRI is rejected
AT%I11=	MSN for remote control via PRI 1
AT%I12=	MSN for remote control via PRI 2
AT%I04=x,y	Channel select for PRI 1 / PRI 2
AT%I06=c1,c2,c3,c4	Progress messages
AT%i09=day,bits,enb	Day-day of statistics reset Bits – 0= no dial tone 1=continuous 3=discontinuous

Basic GSM Settings	
AT%G00=rr,gggggg,gggggg, gggggg,gggggg,gggggg	g,r=Number of GSM group for each GSM module
AT%G01=mode,atms,atfs	Voice processing settings (for GM22 GSM modules only) mode – algorithm (0-none, 1-semiduplex, 2-fullduplex)atms,atfs – transit, receive gain (3=+5dB, 1=+2.5dB, 0=0dB, 2=-2.5dB, 4=-5dB
AT%G02=mode,atms,atfs	Voice processing settings (for TC35 GSM modules only) mode – algorithm (2-echo canceller)atms,atfs – transit, receive gain (3=+5dBm, 1=+2.5dB, 0=0dB, 2=-2.5dB, 4=-5dB
AT%G06=mmdd,…mmdd…	List of holiday days (mm-month;dd-day), max length of line is 63 chars!
AT%G07=mmdd,…mmdd	Net list of holiday days
AT%G08=delay,min,max,tout	Parameters of dialling from ISDN to GSMdelay– relax delay between callsmin – minimum length of number dialled from ISDNmax – maximum length of number dialled from ISDNtout – delay between dialled digits

GSM Settings (X-GSM Group)	
AT%G#0=sim	Mode of switching SIM card sim=0: 0 – OFF – group is turned-off sim>0: 1-4 – SIM card 1-4; 5 – switching by time; 6 – switching at random time
AT%G#1=netid,clir,min,sms, sec,sec2,pseudo	Basic parameters of SIM card in slot 1 netid-network number clir – 0=default,1=enabled,2=disabledmin – maximum number of minutes called sms – maximum number of SMS sent sec – minimum call length (not for cdr info)sec2 – accuracy of call length measurement (not for cdr info)pseudo – default = 0
AT%G#2=netid,clir,min,sms, sec,sec2,pseudo	Basic parameters of SIM card in slot 2
AT%G#3=netid,clir,min,sms, sec,sec2,pseudo	Basic parameters of SIM card in slot 3
AT%G#4=netid,clir,min,sms, sec,sec2,pseudo	Basic parameters of SIM card in slot 4
AT%G#5= from/to[/from,to/w+]	Time intervals for using SIM card in slot 1, one or two intervals (from=to=hh:mm), w+(w-) parameter 'w+' (all weekend), or 'w-' (no weekend) for enabled/disabled SIM on weekends. In case AT%G#0=6 from/to= min/max limit for generating random time for SIM switching
AT%G#6= from/to[/from,to/w+]	Time intervals for using SIM card in slot 2
AT%G#7= from/to[/from,to/w+]	Time intervals for using SIM card in slot 3
AT%G#8= from/to[/from,to/w+]	Time intervals for using SIM card in slot 4

List of Networks	
AT%N#0=op/np,...op/np	List of prefixes replaced by new prefixes (#-number of netlist; op-old prefix;np-new prefix)
AT%N#1=pr/n,...pr/n	List of prefixes dialled into ISDN (to be used for LCR table) pr=prefix n=length of number (parameter /n is optional)
AT%N#2..7=pr/n,...pr/n	Other 7 lists of prefixes dialled into ISDN
AT%N#9=net,max	Net-network number, max-default length of number dialled from ISDN
LCR Table	
AT&R	Shows LCR table
AT%R##=net,hh:mm/hh:mm/w ,gr*	Settings of line ## (0..63) of LCR tablenet – number of network list (0..8)hh:mm/hh:mm/w* – line using time limitation gr – GSM group numbers

Test Calls	
AT!SPxx=dial	Initiates testing call from AUX interface (xx is the called interface): 1..15, 17-31 B-channel 32-rotating B-channel
AT!SGxx=dial	Initiates testing call from AUX interface (xx is the called interface): 00..31 GSM module 32- to GSM via GSM module according to call prefix
AT!WPxx	Connects the following call from interface xx to AUX interface 1..15, 17-31 from B-channel No. 32 first incoming calls from ISDN
AT!WGxx	Connects the following call from interface xx to AUX interface 00..31 from GSM No. 32 first incoming calls from GSM
AT!D	Terminates call on AUX interface
Trace	**Trace can be activated for only one session at a time.**
AT!RE	Start tracing of error messages on active interface
AT!Lx	Start tracing of LAN & Telnet on layer xx=2 – Layers IP,TCP,Telnetx=3 – Layers TCP, Telnetx=4 – Layer Telnet
AT!Rx	Start tracing of ISDN PRI & GSM on layer xx=1 – Layers 1,2,3,4x=2 – Layers 2,3,4x=3 – Layers 3,4x=4 – Layer 4
AT!RR	Start tracing (AT!R2) to COM1 interface
AT!RX	Stop tracing (AT!R2) to COM1 interface

SMS Control	SMS control can be activated for only one session at a time.
AT!G=#	A6 – activate control via used session55 – deactivate control via used session99 – deactivate control on all sessions
AT^MS=ch	Module status ch=0 – 31
***module: ch,sim,sts3,sts2,phs2,type**	Response to AT^MS:ch – number of wireless enginesim – number of currently used SIM: 0-none, 1-8-holder 1-8sts3 – status of layer 3sts2 – status of layer 2phs2 – substatus of layer 2type – type of wireless engine
AT^MI=ch	Module info ch = 0 -31
***minfo: ch,sim,netid,"oper",new,cnt**	Response to AT^MInetid – network ID of active wireless networkoper – name of active wireless networknew – number of received and saved SMS on SIM cardcnt – total number of sent SMS messages according to statistics
***smsinc: ch,ix,sts,mem**	SMS message has been received and savedix – index number of saved SMS (0-250)sts – status of SMS (from +CMGL: ix.sts.len)mem – type of used storage (1,2,3)
***smsrep: ch,ix,sts,mem**	SMS status confirmation has been receivedsts – reserved (0)
***smsout: ch[/id],ref,req**	SMS message was sent and not saved to SIM cardRef – reference number of SMS (0-255) – to be used in status confirmation messagesID – third party identification number of SMS
***smspdu: ch,ix,sts,len,pdu,csum**	Content of SMS messagelen – length of SMS message (number of bytes in PDU)PDU – content of message in PDU formatcsum – checksum of all PDU bytes (2 hexa digits) calculated without carry
***smsdel: ch,ix**	SMS message deletion confirmation
***smserr: ch[/id],ix,req,err,cms**	Fault command response, or SMS not sentreq – required wireless engine or GSM grouperr – error code (6-busy,40-write,41-read,42-delete,43-list)cms – error cause from wireless engine
***smssel: ch,cnt**	SMS storage change confirmation

SMS Control	SMS control can be activated for only one session at a time.
AT^SX=ch	SMS listing - request for listing of all SMS messages and status confirmations saved on SIM card. Possible answers:: *smserr (busy,list) or *smsinc (ix=1..255) for each saved SMS or status SMS , end of list or empty SIM card - *smsinc (ix=0).
AT^SR=ch.ix	SMS read - request for reading of an SMS message or SMS status saved on SIM card. Possible answers: *smserr (busy,read) or *smspdu
AT^SD=ch,ix	SMS delete - request for deletion of an SMS message (or SMS status message). Possible answers: *smserr (busy,delete) or *smsdel
AT^SM=ch,len,pdu,chsum	SMS to module - request for sending a message via GSM module 0..31 or via any GSM module (ch=32). Possible answers: *smserr (busy,write) or *smsout
AT^SG=grp[/id],len,pdu,csum	SMS to group - request for sending an SMS message via GSM group 1..8. Possible answers: *smserr (busy,write) or *smsout
AT^SS=ch,mem	Command for changing SMS storage. Mem (1;2;3) = type of SMS storageSiemens:1=SM, 2=ME, 3=MEEricsson:1=SM, 2=ME, 3=MEWavecom:1=SM, 2=ME, 3=SR Huawei:1=SM, 2=SM, 3=SMSierraWir.:1=SM, 2=ME, 3=SRMotorola:1=IM, 2=IM, 3=IM

5. Advanced Configuration

This section contains description of the call data records and statistics generated by the **2N® StarGate / BlueTower** gateway. A guide to the advanced gateway configuration using AT commands is also available.

Here is what you can find in this section:

- 5.1 List of Status Codes
- 5.2 Trace
- 5.3 Tracing
- 5.4 List of LOG Events
- 5.5 CDR Line Description
- 5.6 SDR Line Description
- 5.7 Statistics
- 5.8 List of SNMP traps

5.1 List of Status Codes

Plug-In Boards

Board Types	
Name	**Description**
NONE	(no board)
VIP172	VoIP board
CPU	(CPU board is not displayed)
PRI 132	2PRI port NT/TE board
GSMxxx	2GSM module + (2SIM board)

Board Types		
Name	**Description**	**What follows**
INIT	HW board reset and init of respective SW parts in progress	OK/CHECK
ERROR	Board in wrong slot or defective board HW	board reset
POWER	Only upon system power on or AT!Bxx=RESET command	DETECT
OK	Rest status, HW is working on board (full operation)	DISC
UNDEF	Empty slot	DETECT
CHECK	Board firmware check (AUX only)	ERASE
ERASE	Board firmware erasing (AUX only)	PROF
PROG	New board firmware loading (AUX only)	OK
DETECT	New board plug-in detected	INIT
DOWN	Frozen status, HW is working on board but no new calls are started	board reset
MODEM0	Parameter S80 sent to modem (AUX only)	MODEM1
MODEM1	Parameter S81 sent to modem (AUX only)	OK
DISC	Board plug-out detected	UNDEF

ISDN Layer Statuses

ISDN Layer 1			
Name	**Description**		
DEACT	Deactivation – no signal received		
ACTIVE	Activation – full synchronisation achieved (frame,multiframe,crc)		
SIGNAL	Signal received – no synchronisation		
SYNC	Signal received – only partial synchronisation (frame)		
ISDN Layer 2			
Name	**Name According to Q.921**		
NOTEI	TEI Unassigned		
AWTEI	Assigned Awaiting TEI		
AWTEST	Establish Awaiting TEI		
OKTEI	TEI Assigned		
AWEST	Awaiting Establishment		
AWREL	Awaiting Release		
OKEST	Multiple Frame Established		
TIMREC	Timer Recovery		
ISDN Layer 3			
Name	**Name According to Q.931**	**NT Description**	**TE Description**
NULL	Null	Rest status, ready for call	
CINIT	Call Initiated	Call from PRI indicated	Call to PRI started
OVSEND	Overlap Sending	Gradual dialling receiving	Gradual dialling sending
OPROC	Outgoing Call Proceeding	Dialling from PRI terminated	Dialling to PRI terminated
CDELIV	Call Delivered	Call from PRI ringing	Call to PRI ringing

CPRES	Call Present	Call to PRI started	Call from PRI indicated
CRECV	Call Received	Call to PRI ringing	Call from PRI ringing
CONREQ	Connect Request	Call to PRI answered	Call from PRI answered
IPROC	Incoming Call Proceeding	Dialling to PRI terminated	Dialling from PRI terminated
ACTIVE	Active	Connected call	
DISREQ	Disconnect Request	End of call from PRI	End of call to PRI
DISIND	Disconnect Indication	End of call to PRI	End of call from PRI
RELREQ	Release Request	Channel release request	
OVRECV	Overlap Receiving	Gradual dialling sending	Gradual dialling receiving
RSTREQ	Restart Request	Channel restart request sent	
RSTART	Restart	Channel restart request received	

ISDN Layer Management Statuses	
Name	**Description**
INIT	Initialisation upon PRI board reset
IDLE	Activation – rest status, necessary for layers 2 and 3
DISC	Deactivation

GSM Layer Statuses

GSM Layer 2		
Name	**Description**	**What Follows**
INIT	GSM module initialisation start	PINREQ
SIM0	Module switch to internal SIM card	INIT
PINREQ	Module PIN request	PINSET
PINSET	PIN value sending to module	INFO
BLOCK	Module blocked temporarily or permanently (see Layer 2 information)	INIT
SETUP	Module configuration running	IDLE
SLEEP	Module sleep running (transition to BLOCK status)	BLOCK
NWAIT	Awaiting GSM log-in	SETUP
IDLE	Rest status, can start/receive call, execute AT&G command	CALL/CMD
CALL	Call running (call establishing, connected call, call end)	IDLE
CMD	Communicating with module upon AT&G command	IDLE
INFO	Information loading from module and SIM card	NWAIT

GSM Layer 2 Info for BLOCK	
Name	**Description**
(block)	Blocked by AT&G command, terminated by module, board or system reset
Netw-reg	GSM log-in refused (not activated SIM), next attempt in 5..60 minutes
Clir-err	CLIR activation request refused, next attempt in 2..10 minutes
Mod-err	Defective or unconnected GSM module, next attempt in 2 minutes
Pin-err	Wrong PIN, permanently in BLOCK status
Sim-err	Defective or non- inserted SIM card, next attempt in 2 minutes
Log-out	Temporarily logged-out according to parameter X00
Puk-req	SIM card requires PUK
(undef)	This position of SIM card was not checked by gateway

GSM Layer 3	
Name	**Description**
NULL	Rest status, ready for call
CINIT	Request of call to GSM (from Layer 4)
OPROC	Call to GSM is connected
CDELIV	Call to GSM is ringing
CPRES	Indication of call from GSM (from Layer 2)
CRECV	Call from GSM is ringing on ISDN interface
IPROC	Call from GSM is processed by ISDN interface
ACTIVE	Connected call
DISREQ	Disconnection request (to Layer 2)
DISIND	Indication of disconnection (from Layer 2)
RELREQ	Module release for another call (to Layer 2)
OVRECV	Reading of DTMF dialling from GSM (from Layer 2)
RELIND	Indication of module release (from Layer2)

Link Layer Statuses

Layer 4	
Name	**Description**
NULL	Rest status, ready for call
MORE	Call request received from GSM or ISDN, awaiting further dialling or timeout
SETUP	Call request sent to opposite interface
PROC	Call request confirmed, awaiting call answer
ACTIVE	Connected call
DISC	Call disconnection in progress

Command Shell Statuses

Command Shell	
Name	**Description**
IDLE	Rest status, awaiting AT commands
REQUEST	Communication with GSM module upon AT&G command is displayed
REPORT	Active tracing
LOGFILE	Content of log file is being written out
CALLFILE	Content of call file is being written out
CALLREAD	Call file records are read
AUTOFILE	Content of incoming call auto routing chart is being written out
QUERY	(not used so far)
SCREEN	(not used so far)
MATRIX	Active matrix screensaver
FUNCFILE	Content of debug file is being written out
LCRFILE	(not used so far)

Telnet Layer	
Name	**Description**
LOGOUT	User logged-out
LOGIN	User is entering name
PASSW	User is entering password
IDLE	User logged-in

Records of Events and Calls

Record Type in Log File	
Name	**Description**
POWER	System power on, power off or reset
INIT	Initialisation of EEPROM (configuration) or Flash (upgrade)
HW-ERR	HW error of plugged-in board
SYSERR	System error (memory error, etc.)
BRDIN	Board plugged-in
BRDOUT	Board plugged-out
BRDRES	Board reset using AT!B command
L1-ERR	PRI port layer 1 error (ISDN1)
L2-ERR	PRI port layer 2 error (ISDN2)
L3-ERR	PRI port layer 3 error (ISDN3)
G2-ERR	GSM module layer 2 error (gate2)
G3-ERR	GSM module layer 3 error (gate3)
C4-ERR	Link layer error (call4)

Record Type in Call File	
Name	**Description**
I-FD	Unconnected incoming call attempt
I-OK	Connected incoming call
O-FD	Unconnected outgoing call attempt
O-OK	Connected outgoing call

5.2 Trace

With tracing activated, the internal system messages (transmitted between processes), messages received on and sent to the PRI / VoIP ports, and AT commands and replies sent to GSM modules are written out. The listing of a message related to a specific call starts with the B-channel and GSM module numbers and an arrow showing the message direction. The right arrow (–>) means a message received on an interface (PRI, GSM, LAN) or a message directed from a lower layer process to a higher layer process (indication, confirmation). The left arrow (<–) designates a message sent to an interface (PRI, GSM, LAN) or a message directed from a lower layer process to a higher layer process (request, response). The message type (layer 3 messages are shifted by a space to the right, layer 4 messages by two spaces to the right) and the message content follow.

ISDN Messages

Typically Used ISDN Messages (Q.931)	
!alertin	Alerting
!callproc	Call proceeding
!progress	Progress
!setup	Setup
!connect	Connect
!setack	Setup acknowledge
!connack	Connect acknowledge
!disconn	Disconnect
!restart	Restart
!release	Release
!restack	Restart acknowledge
!relcompl	Release complete
!facility	Facility
!notify	Notify
!stsenq	Status enquiry
!info	Information
!status	Status

Typically Used ISDN Elements - Cause (Q.850)		
ID	**Name**	**Whole name**
1	**Unassnumb**	Unassigned number
6	**Unaccchan**	Channel unacceptable
16	**Clear**	Normal call clearing
17	**Userbusy**	User busy
21	**Reject**	Call rejected
27	**Destout**	Destination out of order
28	**Invformat**	Invalid number format
30	**Stsenqresp**	Response to StatusEnquiry
31	**Normal**	Normal, unspecified
34	**Noanychan**	No channel available
41	**Tempfail**	Temporary failure
42	**Swcongest**	Switching equipment congestion
44	**Noreqchan**	Requested channel not available
65	**Nobearer**	Bearer capability not implemented
81	**Callref**	Invalid call reference value
88	**Dest**	Incompatible destination
96	**Elemmiss**	Mandatory information element is missing
97	**Message**	Message type non-existent or unimplemented
99	**Element**	Information element / parameter non-existent or unimplemented
100	**Elemerror**	Invalid information element contents
101	**Incmess**	Message incompatible with call state
102	**Timeout**	Recovery on timer expiry
127	**Undefined**	Interworking, unspecified

5.3 Tracing

2N® StarGate / BlueTower allows for operation tracing (VoIP, SIP, GSM). Tracing is accessible in one session only at a time, the other tracing requests are rejected with BUSY. With regard to a rather extensive volume of data, we recommend that the Write communication into file function should be activated before tracing. Any Telnet-supporting terminal (HyperTerminal, Putty, etc.) can be used.

Tip

- You are advised to synchronise your GSM gateway with the SIP Proxy, or a PC before tracing.

AT Command	Description
AT%S92=x	Description AT%S92=x Set the tracing details. Refer to the table below for value X.
AT!R2	Start tracing via the active session.
Any character	Terminate tracing.

Layer 3 and 4 Status Listing	Timestamp Write-Out	SMP Packet Write-Out	Layer 2 Status Listing	LCR Listing
1	2	4	8	16

The resultant value X is a sum of the required functions (X= timestamps+LCR = 16+2 = 18, e.g.).

5.4 List of LOG Events

Table of LOG events:

Type	Text	Description
POWER	[Power on]	System switched on
	[Power off]	System switched off
	[Warm boot]	Restart of system, unknown cause
	[Watchdog]	Restart of system by watchdog
	[BKPT code]	CPU error: break code detected
	[Stack error]	CPU error: stock integrity failure
	[Divided by zero]	CPU error: dividing by zero
	[RETI code]	CPU error: illegal using of instruction reti
	[NMI intr]	CPU error: wrong interrupt
	[VOID intr]	CPU error: wrong interrupt
	[Upgrade reset]	Start of upgrade firmware procedure
	[Software reset]	Reset by AT commands (at&fres…)
INIT	Eeprom	Initialisation of eeprom (configuration)
	Flash	Initialisation of flash memory (firmware)
HW-ERR		(##…address of chip, RD…read value/WR…expected value)
	Codec ##, RD/WR	Error in initialisation of codec on GSM,AUX board
	Duart #####, RD/WR	Error in initialisation of serial controller on GSM board
	Hscx #####, RD/WR	Error in initialisation of HDLC controller on AUX board
	Pri #####, RD/WR	Error in initialisation of PRI controller
SYSERR	User stack error!	SW error: stock integrity failure
BRDIN	#08 TYP STS	Board inserted (number of gsm board, type, status)
BRDOUT	#08 TYP STS	Board disconnected

BRDRES	#08 TYP STS	Reset the board by AT command
	ALL GSM RESET CMD	Reset all GSM boards by AT command
	SYSTEM RESET CMD	Reset the system by at&bsys command

Type	Text	Description
L1-ERR		(reserved)
L2-ERR		Error of ISDN layer 2 by Q.921
	A: unsol.RX(F)	Received packet RR,RNR,REJ with unexpected bit F=1
	B: unsol.DM(F)	Received packet DM with unexpected bit F=1
	C: unsol.UA(F)	Received packet UA with unexpected bit F=1
	D: unsol.UA(–)	Received packet UA with unexpected bit F=0
	E: unsol.DM(–)	Received packet DM with unexpected bit F=0
	F: peer re-est	Received packet SABME in status OKEST
	G: repeated SABME	Repeated unsuccessful send of packet SABME
	H: repeated DM	Repeated unsuccessful send of packet DM
	I: failed (TIMREC)	Unsuccessful breaking-up of status TIMREC
	J: N(R) error	Received wrong value N(R) – numbering of packets
	K: recv.FRMR	Received packet FRMR (information about error)
	L: undef.frame	Received packet of unknown type
	M: (I field)	Received wrong I-packet (numbered packet)
	N: frame size	Received packet with wrong length
	O: N201 error	Value N201 was exceeded (max length of packet)
L3-ERR	tout sts # (p##)	Error of isdn layer 3: timeout in status # on channel p##
G2-ERR	ATD/ERROR init (g##)	Error of isdn layer 2: restart of module g## after rejected command ATD by GSM network
	GSM Cause 150 (g##)	Error of isdn layer 2: restart of module g## after cause 150 was received (call barred by GSM network)
G3-ERR	tout sts # (g##)	Error of isdn layer 3: timeout in status # on module g##
C4-ERR	tout sts # (p##/g##)	Error of connecting layer 4: timeout in status # on call between channel p## and GSM module g##

5.5 CDR Line Description

For the current CDRs see the Gateway / Gateway control – CDR file section or use the AT&C / AT&CR AT commands for Telnet sessions.

****Date Time Type Cause From/to Groups conn. durat. aoc-info gid CDN CGN IMSI/SCID**

- **Column 1**: **
- **Column 2**: date/time of call start
- **Column 3**: type of call
- **Column 4**: CAUSE sent to ISDN
- **Column 5**: number of used channel/number of used GSM module
- **Column 6**: used GSM group (C= CallBack to PRI 1 , E= call via PRI 2 interface)
- **Column 7**: call setup time
- **Column 8**: call duration in mmm:ss (max 255:59) or error cause for unconnected calls
- **Column 9**: call cost (will be implemented in a higher firmware version)
- **Column 10** : gateway id (optional)
- **Column 11**: called number
- **Column 12**: calling number
- **Column 13**: slot number/IMSI* of used SIM card

5.6 SDR Line Description

Refer to the **Gateway->Gateway control->SDR file** section for the current SDRs.

** **date** **time** **type** **error** **usr/gr/mo** **ssec** **date** **time** **pn/pt** **gid**

- **Column 1**: **
- **Column 2**: date/time – sdr record creation time
- **Column 3**: type of SMS
  - R-OK – delivered OK – SMS received
  - S-FD – sending ERROR – SMS sending error
  - S-OK – send OK – SMS was sent but no SMS delivery receipt was required
  - S-TO – sending timeout – SMS was not sent within the set timeout
  - D-ER – delivery ERROR – SMS delivery error
  - D-OK – delivered OK – SMS delivered
  - D-TO – delivery timeout – SMS was not delivered within the set timeout
- **Column 4**: error type
  - for (D-OK): SMS receipt status (typically E – 000)
  - for (D-ER): SMS receipt error code
  - for (S-FD): module +CMS ERROR (typically E – 028)
  - for (S-FD): internal error (E – 902 = no rule to send)
- **Column 4**: user id/SMS group/GSM module
- **Column 5**: SMS sending time
- **Column 6**: date/time
  - First row – SMS sending time or total sending time for all parts of a long SMS
  - Second row – time of SMS adding to the outgoing/incoming SMS database
- **Column 8**: part number/total
- **Column 9**: gateway id

5.7 Statistics

[Statistic of calls on PRI and in groups]

pri/grp	(reset)	minutes	hhhh:mm:ss	calls	reject	failed	c.offs	errors
#pr out (1.03)		1303	21:43:07	521	1	24	147	2
#pr inc (1.03)		41	0:41:28	24	0	6	1	0

[Statistic of calls on PRI and in groups]

gsm	(reset)	minutes	hhhh:mm:ss	calls	reject	failed	c.offs	errors
#i1 inc	(31.12)	0	0:00:00	0	0	0	0	0
#i2 inc	(31.12)	0	0:00:00	0	0	0	0	0
#i3 inc	(31.12)	0	0:00:00	0	0	0	0	0
#i4 inc	(31.12)	0	0:00:00	0	0	0	0	0

gsm	(reset)	minutes	hhhh:mm:ss	calls	reject	failed	red.in	redout
#g1 out	(31.12)	0	0:00:00	0	0	0	0	0
#g2 out	(31.12)	0	0:00:00	0	0	0	0	0
#g3 out	(31.12)	0	0:00:00	0	0	0	0	0
#g4 out	(31.12)	0	0:00:00	0	0	0	0	0
#g5 out	(31.12)	0	0:00:00	0	0	0	0	0
#g6 out	(31.12)	0	0:00:00	0	0	0	0	0
#g7 out	(31.12)	0	0:00:00	0	0	0	0	0
#g8 out	(31.12)	0	0:00:00	0	0	0	0	0

[Statistic of incoming calls on all modules]

modules	brd	minutes	hhhh:mm:ss	calls	sms	minutes	hhhh:mm:ss	calls	sms
#00 #01	00	0	0:00:00	0	0	0	0:00:00	0	0
#02 #03	01	0	0:00:44	1	0	16	0:16:37	10	0
#04 #05	02	14	0:14:15	7	0	5	0:05:31	3	0
#06 #07	03	4	0:04:21	3	0	0	0:00:00	0	0
#08 #09	04	0	0:00:00	0	0	0	0:00:00	0	0
#10 #11	05	0	0:00:00	0	0	0	0:00:00	0	0
#12 #13	06	0	0:00:00	0	0	0	0:00:00	0	0

*each line is for two wireless modules

[Statistic of calls on GSM module #0]

sim/dir	net/grp	minutes	hhhh:mm:ss	calls	reject	failed	c.offs	sms
#1 inc	/1	14	0:14:15	7	0	2	9	0
#2 inc	/1	0	0:00:00	0	0	0	0	0
#3 inc	/1	0	0:00:00	0	0	0	0	0

```
#4  inc     /1        0    0:00:00      0      0      0      0      0
-------------------------------------------------------------------------------
#1  out     /1      439     7:19:51    177      0      6     44      0
#2  out     /1        0    0:00:00      0      0      0      0      0
#3  out     /1        0    0:00:00      0      0      0      0      0
#4  out     /1        0    0:00:00      0      0      0      0      0
```

Pri/grp : type of calls.

Reset : date of last reset the statistics.

Minutes : number of minutes.

Hhhh:mm:ss : same number converted to time.

Calls : number of calls.

SMS : number of sent SMS messages.

Reject: number of unconnected calls (no available free GSM module-call rejected with cause 41(42)).

Failed: number of unconnected calls (rejected by GSM network).

C.offs: number of unconnected calls (terminated by calling party).

Errors: number of unconnected calls (wrong requests - disallowed prefix, etc.).

Red.in: number of connected calls (rerouted to this GSM group).

Redout: number of connected calls (rerouted to another GSM group).

5.8 List of SNMP traps

List of SNMP traps:

Type	Text
VoIP board	VoIP board missing
	VoIP board inserted
	VoIP board ERROR
	VoIP board OK
	Too many busy VoIP channels
	Number of busy VoIP channels decreased under maximum level
	Too low number of busy VoIP channels
	Number of busy VoIP channels increased over minimum level
	VoIP SIP line is not registered
	VoIP SIP line is registered
PRI board	PRI board missing
	PRI board inserted
	PRI board ERROR
	PRI board status: OK
	PRI 1 link unplugged, layer1 deactivated
	PRI 1 link plugged in, layer1 activated
	PRI 1 link layer 2 not established
	PRI 1 link layer 2 established
	PRI 2 link unplugged, layer1 deactivated
	PRI 2 link plugged in, layer1 activated
	PRI 2 link layer 2 not established
	PRI 2 link layer 2 established
	Too many number of busy B-channels on PRI 1 link
	Number of busy B-channels on PRI 1 link decreased under maximum level
	Too low number of busy B-channels on PRI 1 link
	Number of busy B-channels on PRI 1 link increased over minimum level
	Too many number of busy B-channels on PRI 2 link
	Number of busy B-channels on PRI 2 link decreased under maximum level
	Too low number of busy B-channels on PRI 2 link
	Number of busy B-channels on PRI 2 link increased over minimum level
GSM slots	GSM board in slot missing
	GSM board in slot inserted
	GSM board ERROR
	GSM board in slot, status: OK
	First GSM module on GSM board: ERROR
	First GSM module on GSM board: OK
	First GSM module on GSM board has too strong signal level
	First GSM module on GSM board decreased under level of too strong signal level
	First GSM module on GSM board has weak signal level

	First GSM module on GSM board increased over level of too weak signal level
	Second GSM module on GSM board: ERROR
	Second GSM module on GSM board: OK
	Second GSM module on GSM board has too strong signal level
	Second GSM module on GSM board decreased under level of too strong signal level
	Second GSM module on GSM board has weak signal level
	Second GSM module on GSM board increased over level of too weak signal level
Power supply	Power supply fail
	Power supply ok
SMS buffer	Number of SMS/SMPP messages in memory exceeds defined max level
	Number of SMS/SMPP messages in memory decreased under defined max level
	Number of SMS/SMPP messages in memory exceeds defined max level
	Number of SMS/SMPP messages in memory decreased under defined max level

6. Technical Parameters

This section provides technical conditions for the **2N® StarGate / BlueTower** installation.

- 6.1 2N® StarGate Technical Parameters
- 6.2 2N® BlueTower Technical Parameters

6.1 2N® StarGate Technical Parameters

Subrack

Dimensions (W x H x D)	482 x 133 x 360 mm (84HP x 3U x 360 mm)
Weight (full configuration)	9,800 g
Power supply	100-240V AC / 50-60Hz,or 48 DC
Power input	up to 230VA

GSM / UMTS

Mobile network type	GSM phase II or UMTS
Transmission output per channel	900MHz / 2W, 1800MHz / 1W or850MHz / 2W, 1900MHz / 1W or850MHz / 1900MHz / 2100MHz UMTS
SIM cards	Plug-in small 3V
VF connector	GSM boards with TC35i,MC55i,Q55,UC864 UMTS boards with MC8790Vmodule connector – SMA 50ohm
Antenna splitter	Only external models

PRI Interface(s)

Interface	1PRI or 2ISDN PRI
Frame	E1
CRC	Supported
Signalling	Q.931-EDSS1
Type (NT or TE)	Switchable NT or TE
TEI number	0 – 63
Clock (master or slave)	Master/Slave
Connector RJ 45, Rxpin, Txpin	Switchable RJ45 (Rx-1,2 Tx-4,5 / Rx-4,5 Tx-1,2)
D channel timeslot	16

VoIP Interface

Interface	Switch 4x 10/100BaseT
Signalling	SIP
Voice compression	G.723.1; MP-MLQ at 6.3, ACELP at 5.3 kbps G.729 Annex A, B; CS-ACELP at 8kbps G.711; PCM at 64kbps (u-Law/A-Law)
Number of voice channels	30
Connector type	4 RJ45 (Ethernet switch)

Temperature

Working temperature range	0°C to + 40°C
Relative humidity	up to 95% at 40°C
Air – condition	Recommended

Remote Control Line Types

Type of line	Serial line (COM1), Ethernet 100baseT - Telnet, ISDN PRI (PRI 1, PRI 2), Web interface – HTTP,HTTPS

6.2 2N® BlueTower Technical Parameters

Rack

Dimensions (W x H x D)	160 x 185 x 320 mm (29HP x 3U x 320 mm)
Weight (full configuration)	4.1 kg
Power supply	100-240V AC / 50-60Hz
Power input	up to 50VA

GSM / UMTS

Mobile network type	GSM phase II or UMTS
Transmission output per channel	900MHz / 2W, 1800MHz / 1W or850MHz / 2W, 1900MHz / 1W or850MHz / 1900MHz / 2100MHz UMTS
SIM cards	Plug-in small 3V
VF connector	GSM boards with TC35i, MC55i, Q55UMTS, UC864 boards with MC8790V module connector – SMA 50Ohm
Antenna splitter	Only external

PRI Interface(s)

Interface	1PRI or 2ISDN PRI
Frame	E1
CRC	Supported
Signalling	Q.931-EDSS1
Type (NT or TE)	Switchable NT or TE
TEI number	0 – 63
Clock (master or slave)	Master/Slave
Connector RJ 45, Rxpin, Txpin	Switchable RJ45 (Rx-1,2 Tx-4,5 / Rx-4,5 Tx-1,2)
D channel timeslot	16

VoIP Interface

Interface	Switch 4x 10/100BaseT
Signalling	SIP
Voice compression	G.723.1; MP-MLQ at 6.3, ACELP at 5.3 kbps G.729 Annex A, B; CS-ACELP at 8kbps G.711; PCM at 64kbps (u-Law/A-Law)
Number of voice channels	8
Connector type	4x RJ45 (Ethernet switch)

Temperature

Working temperature range	0°C to + 50°C
Relative humidity	up to 95% at 40°C
Air – condition	Recommended

Remote Control Line Types

Type of line	Serial line (COM1), Ethernet 100baseT – Telnet, ISDN PRI (PRI 1, PRI 2), Web interface – HTTP, HTTPS

7. Supplementary Information

This section provides supplementary information on the product.

Here is what you can find in this section:

- 7.1 Troubleshooting
- 7.2 List of Abbreviations
- 7.3 Regulations and Directives
- 7.4 General Instructions and Cautions

7.1 Troubleshooting

For the most frequently asked questions refer to faq.2n.cz.

- Calls to GSM / UMTS still go over the PRI 2 interface
  - The prefix you are calling is not included in any prefix list.
  - There is no rule in the LCR table connecting this prefix list with at least one GSM outgoing group.
  - The call type is not voice (FAX, DATA).
  - The used voice codec is uLaw (the gateway supports aLaw only).
- SMS at no answer does not contain the **Calling party number**
  - The **Text of SMS at no answer** parameter must contain **%n**, which represents the calling party number.
- The Init LED is flashing on the GSM / UMTS board
  - You are using a GSM / UMTS card from a different type of gateway (for example, you are using a **2N® BlueTower** card in **2N® StarGate**).

7.2 List of Abbreviations

List of Abbreviations in the document:

- **APN**
  Access Point Name – necessary for the GPRS service
- **CLIP**
  Calling Line Identification Presentation
- **CSD**
  Circuit Switched Data
- **COM**
  PC serial port
- **DTMF**
  Dual Tone Multi Frequency – tone dialling
- **EG**
  StarGate/BlueTower
- **FSK**
  Frequency Shift Keying
- **FXO**
  an interface electrically identical with a standard telephone (opposite side = FXS interface)
- **FXS**
  a telephone interface allowing standard telephone connection (opposite side = FXO interface)
- **FW**
  Firmware – similar to SW, a term for the central microprocessor program
- **GSM**
  Group Switched Mobile system – the present standard digital mobile telephone network
- **GPRS**
  General Packet Radio Service – high–speed data transmission for GSM networks
- **HW**
  Hardware – an electronic device, circuit, board, component, etc. in this context
- **P(A)BX**
  Private (Automatic) Branch Exchange
- **PC**
  Personal Computer (based on the IBM PC standard)
- **PIN**
  Personal Identification Number – a SIM card securing password
- **PUK**
  Personal Unblocking Key – a password used to unblock a blocked SIM card after repeated wrong PIN entering
- **RS–232C**
  a PC serial port standard
- **SIM**
  Subscriber Identity Module – a chip–equipped module to be inserted in a GSM device for identification
- **SMS**
  Short Message Service, a term for the system and one unit (message)
- **SW**
  Software

- **TTL**
  Transistor–Transistor Logic – a standard digital technology defining voltage for levels 0 and 1
- **PSTN**
  Public Switched Telephone Network

7.3 Regulations and Directives

Europe

2N® StarGate conforms to the following directives and regulations:

Directive 1999/5/EC of the European Parliament and of the Council, of 9 March 1999 – on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity

Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

Directive 2004/108/EC of the Council of 15 December 2004 on the harmonisation of the laws of Member States relating to electromagnetic compatibility

Commission Regulation (EC) No. 1275/2008, of 17 December 2008, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment.

7.4 General Instructions and Cautions

Please read this User Manual carefully before using the product. Follow all instructions and recommendations included herein.

- Any use of the product that is in contradiction with the instructions provided herein may result in malfunction, damage or destruction of the product.
- The manufacturer shall not be liable and responsible for any damage incurred as a result of a use of the product other than that included herein, namely undue application and disobedience of the recommendations and warnings in contradiction herewith.
- Any use or connection of the product other than those included herein shall be considered undue and the manufacturer shall not be liable for any consequences arisen as a result of such misconduct.
- Moreover, the manufacturer shall not be liable for any damage or destruction of the product incurred as a result of misplacement, incompetent installation and/or undue operation and use of the product in contradiction herewith.
- The manufacturer assumes no responsibility for any malfunction, damage or destruction of the product caused by incompetent replacement of parts or due to the use of reproduction parts or components.
- The manufacturer shall not be liable and responsible for any loss or damage incurred as a result of a natural disaster or any other unfavourable natural condition.
- The manufacturer shall not be held liable for any damage of the product arising during the shipping thereof.
- The manufacturer shall not make any warrant with regard to data loss or damage.
- The manufacturer shall not be liable and responsible for any direct or indirect damage incurred as a result of a use of the product in contradiction herewith or a failure of the product due to a use in contradiction herewith.
- All applicable legal regulations concerning the product's installation and use as well as provisions of technical standards on electric installations have to be obeyed. The manufacturer shall not be liable and responsible for damage or destruction of the product or damage incurred by the consumer in case the product is used and handled contrary to the said regulations and provisions.
- The consumer shall, at its own expense, obtain software protection of the product. The manufacturer shall not be held liable and responsible for any damage incurred as a result of the use of deficient or substandard security software.
- The consumer shall, without delay, change the access password for the product after installation. The manufacturer shall not be held liable or responsible for any damage incurred by the consumer in connection with the use of the original password.
- The manufacturer also assumes no responsibility for additional costs incurred by the consumer as a result of making calls using a line with an increased tariff.

Electric Waste and Used Battery Pack Handling

Do not place used electric devices and battery packs into municipal waste containers. An undue disposal thereof might impair the environment!

Deliver your expired electric appliances and battery packs removed from them to dedicated dumpsites or containers or give them back to the dealer or manufacturer for environmental-friendly disposal. The dealer or manufacturer shall take the product back free of charge and without requiring another purchase. Make sure that the devices to be disposed of are complete.

Do not throw battery packs into fire. Battery packs may not be taken into parts or shirt-circuited either.

2N TELEKOMUNIKACE a.s.
Modřanská 621, 143 01 Prague 4, Czech Republic
Tel.: +420 261 301 500, Fax: +420 261 301 599
E-mail: sales@2n.cz
Web: www.2n.cz

MG1121v5.4